

4 Agricultural Technology Research Strengthening Subprogram

4.1 Strengthening of UNITINS Agriculture Division at Gurupi

4.1.1 Outline

The University of Tocantins which is shortly named as 'UNITINS' is the only public university (now converted into a 'foundation') in the State of Tocantins. Although it has been functioning as a State University, it is now being converted into a foundation which is supported by the Federal Government, State Government and private organizations. UNITINS is the first Brazilian university to become as a foundation, by which it can be more autonomous and flexible to receive funding from various sources.

UNITINS was founded in 1990 and there are 10 campuses of University centers which are distributed though out the State. The main campus of UNITINS is located in Palmas City, the capital of the state. The University Centers and their main area of teaching and research and the number of students in each center are shown below :

University Center	Area of Specialization	No. of Students in 1996
Palmas	Environmental Engineering, Architecture & Urban Engineering, Accounting, Law, Social Communication and Economics	390
Miracema	Administration, Mathematics	398
Guaraí	Education, Letters	241
Colinas	Law	201
Gurupi	Agronomy	120
Araguaína	Geography, History, Letters, Science (Mathematics), Veterinary Science	1,061
Paraiso	Computer Science, Food Engineering	238
Tocantinópolis	Education	221
Arraias	Education, Mathematics	130
Porto Nacional	History, Geography, Letters and Biology	850
Total		3,850

The University of Tocantins has 26 (twenty six) graduation courses, of which 10 (ten) courses are recognized and 13 (thirteen) courses are under recognition procedures which include agriculture and animal husbandry courses. The remaining courses have authorization only for functioning.

The Campus of Gurupi is one of the main bases of the University of Tocantins Foundation. The activities began in 1992 with the philosophy of integrated development of teaching and research. As one of its main strategies, the campus made partnerships with other national and international agriculture research institutes in order to carry out joint research works. With this policy, presently many project works were implemented

together with farmers associations through state surveys of corn, rice, soybean, feijão bean and vegetables.

After five years of working, the University Campus of Gurupi has grown, covers a bigger area, has developed and presently it needs to improve its role as well as structures and the conceptual bases. The institution that can not propose changes of paradigms in the modern world, shall be exposing to lose competitiveness and in few years to disappear.

The proposal for strengthening of UNITINS agriculture division for further development is presented below. It is obvious that the institutional strengthening shall go through various stages. This project proposal is prepared so as to reach the objectives proposed in this center.

4.1.2 Justification, Background and Necessity of the Project

The agriculture and livestock development of the State of Tocantins is conditioned to depend on the research model which will be generated by the university and therefore a research program based on the state and national agriculture reality is extremely important. Any country or a Brazilian state can not reach a strong agriculture economy without investment in the research which focus on the agriculture and livestock development.

The agricultural technologies present particular characteristics that rarely may be imported and can be adapted immediately as in the application of other technologies such as the industrial sector which do not depend on climatic and soil conditions. The technology for the agrarian science is different, and the technologies which suit to the local conditions is always adapted. The agricultural technologies shall be adequately tested before they reach the farmers in order to verify their effectiveness and their effect on the environment.

Therefore, the University of Tocantins was created not only to supply answer to the main problems existing in the agriculture research area but also to graduate professionals in the state trained to identify the existing problems and resolve them in order to support the social and economic development of Tocantins.

Besides, UNITINS is the first Brazilian university member of the National System of Agriculture Research coordinated by EMBRAPA. All projects submitted to the SNPA were approved.

However, for the execution of research works, a minimum structure is necessary in order to develop the projects such as the structuring of the experimental stations of Gurupi and Formoso do Araguaia. Then, it might be possible to cover practically all the soil and climate conditions as well as the different farmers categories of the south region of Tocantins.

The campus of Gurupi went through a very hard year, and the allocated resources did not correspond to the carried out responsibility. The installation of experiments and then the lack of material conditions to obtain the results was a constant risk faced by the researchers. Besides, the lack of proper installations and equipped laboratories make difficult to train the future agronomists and to provide the appropriate service to the agriculture community of the State.

The responsibility of being the first experience in Brazil that manage teaching of Agrarian Sciences, agricultural researches and rural development is without doubt the biggest barrier to face the mentioned limitations. Therefore, the structuring of Agriculture and Livestock campus of Gurupi is a basic condition to achieve the planned target.

4.1.3 Objectives

The prime objective is to promote the state development by supporting to the agriculture and livestock sector through the training of specialized man power. Research and development of technologies will also be focused considering the existing agriculture practices and the data accumulated from farmers in order to render service for the agricultural development to the different farmers categories. The specific objectives are listed below :

- To train agricultural technician at the undergraduate level
- To contribute for the state development through the execution of agricultural researches
- To participate in the collection and identification of the main agriculture problems
- To organize and coordinate activities with other related organizations, such as RURALTINS, SEAGRI and EMBRAPA in order to unify the procedures and to improve the development of projects and transfer of technologies
- To render services to the farmers in the different areas of Agriculture
- To support the organization of the different categories of farmers
- To contribute for the agricultural economy studies in order to guide the agricultural industry of the state as well as the supply bases for the definition of public policies of this sector

4.1.4 General Information of the Agronomy Division

- 1) The administrative area, teachers rooms, library and processing of data room are working in a rented place in Gurupi.
- 2) The laboratories used for classes of biology, botany, zoology, microbiology, plant pathology, entomology, physics and chemistry, practice room for technology of vegetable products, design room, rural construction and topography room, green house and seedling area are located in a area of 5,425 m².

- 3) The experimental station of Gurupi is its own property with an area of 64.13 ha.
- 4) The experimental station of Rio Formoso project (own property) occupy an area of 145 ha. The individual areas of each facility of the project are : machinery warehouse - 320 m², laboratories - 864m², employees house - 180 m², and dining room - 87.72m².

4.1.5 Research in the Agronomy - Campus of Gurupi

Since the creation of the University Campus of Gurupi, College of Agronomy has the philosophy of research and extension activity. These activities are supported by the 18 researchers/teachers (1997) who are mainly composed of masters and doctors with specific field of specialization.

During this short period (1992-1996), fifty projects were developed, with most of them in the area of genetic improvement (introduction and evaluation of crops - 38%), plant disease (18%), plant technology (10%), Seeds (8%) and 26% in other areas. As result of those projects, 118 scientific reports were prepared and 6 articles were published in technical bulletins with recommendations for cultivation of corn, soybean, rice, etc.

Most of these works are concentrated in the experimental stations of the University and they are developed under the conditions of laboratory structural deficiencies and 50% of them were carried out by students within a Scientific Initiation Program (CNPq/PIBIC/UNITIS). It should also be noted that due to the movement of teachers and structural limitations, the scientific output has been reduced, and especially there is a reduction in the basic research.

The present structure of projects under execution are shown in Fig. XII-4.1(1).

Most of the research activities are concentrated mainly on 'Applied Research' and the Gurupi campus could not receive enough funding to carry out the 'Basic Research'. However, being an university, UNITINS should also focus more attention on developing the basic research.

In order to improve and strengthen the research and teaching activities of Agronomy Division, the following activities (sub-programs) are proposed.

- Strengthening and Expansion of the Gurupi Campus - Agronomy Division
- Strengthening of the Experimental Station at Gurupi
- Strengthening of the Experimental Station at Formosa do Araguaia
- Installation of Automatic Weather Stations at Gurupi and Rio Formosa
- Integrated Training, Promotion and Development of Technology Center for Fruits, Vegetables and Other Farmers (NUTIFH)

These sub-programs are discussed in detail as shown below :

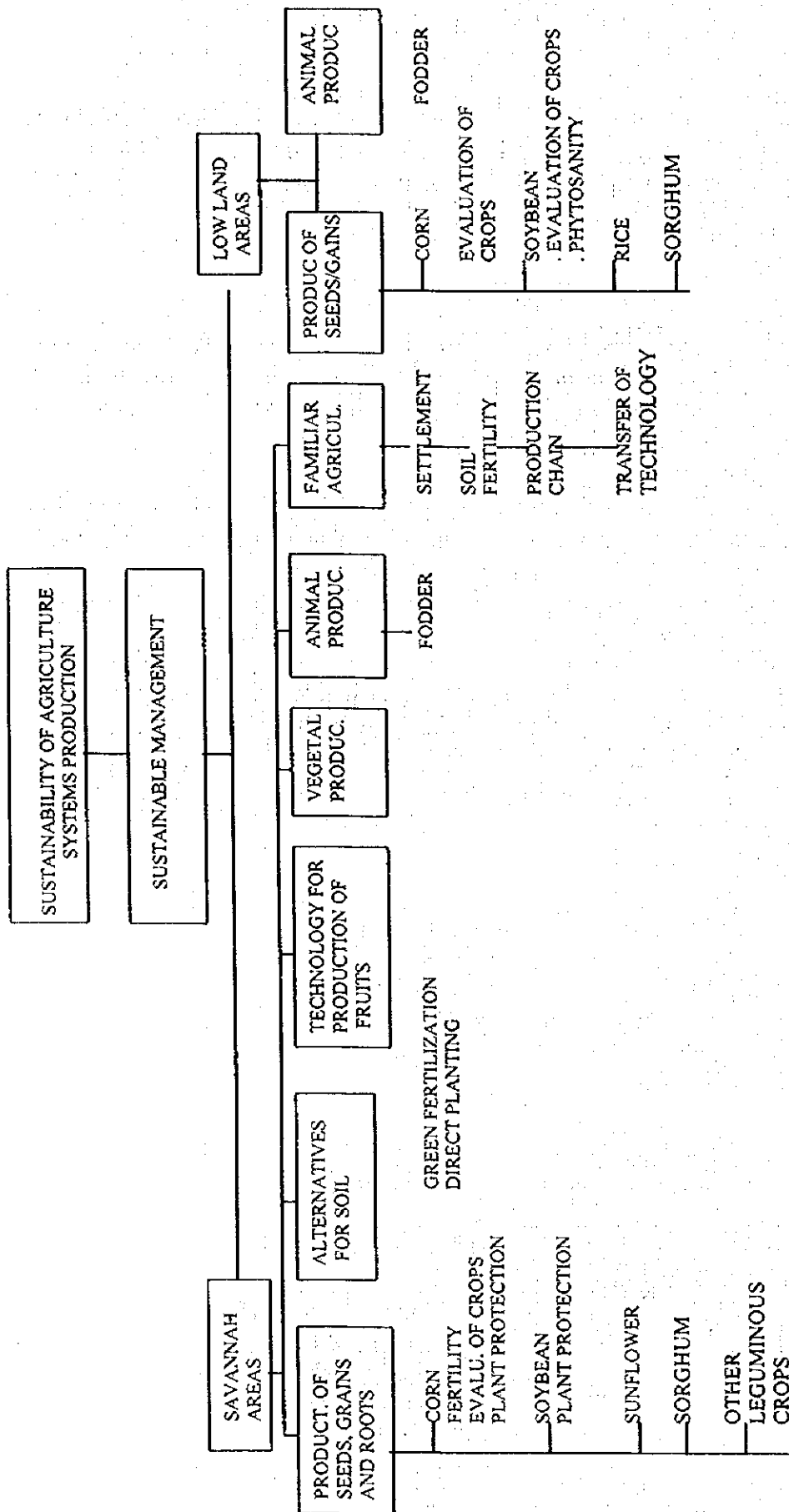


FIG. 1 RESEARCH STRUCTURE OF AGRONOMY PROGRAM OF UNITINS

4.1.6 Strengthening and Expansion of the Gurupi Campus - Agronomy Division

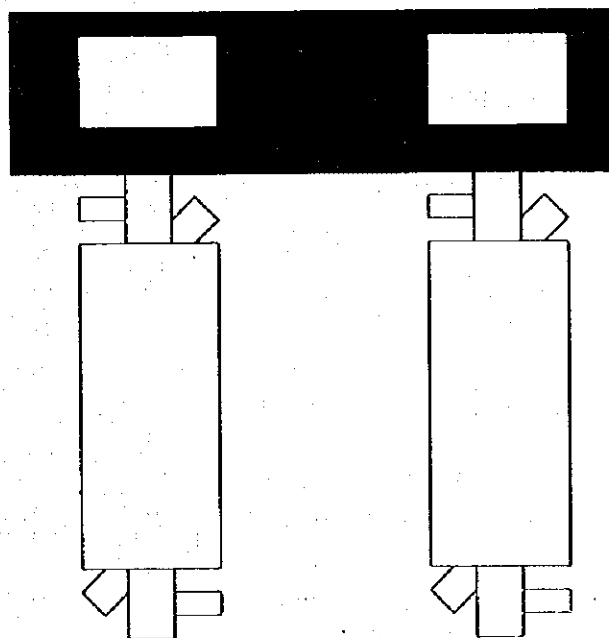
The main objective of the University Campus of Gurupi is to contribute for a sustainable agriculture development of the State of Tocantins. Restructuring with adequate buildings and other facilities are urgently needed to carry out a qualified research in the university.

The rendering of services for the farming community shall be made through physical and chemical analysis of soils, certification of grains and seeds besides conducting the training courses for technicians of the specialized area.

Another important aspect to be considered is the restructuring of the experimental stations of Gurupi, Rio Formoso Station, which are considered as the key stations for the development of agriculture research necessary for the state.

The University of Tocantins foundation is expecting a future expansion of the Courses and has elaborated a project which include construction of two blocks for classrooms and others facilities such as duly equipped laboratories, theater, dinning hall, library, bank agencies, administration rooms, and teachers rooms.

The investment for the expansion of Gurupi Campus was estimated in July 1997 as R\$ 7,129,787.00. The principal blocks of the Campus are shown below :



Area of the main block with auditorium, bank and other facilities = $4,291 \text{ m}^2$,
Area of the teaching/laboratory blocks 1, and 2 = $2 \times 2,524 \text{ m}^2$
Total area = $9,339 \text{ m}^2$.

Apart from the construction of buildings, the laboratories are planned as shown below :

Unit : R\$	
Laboratories	Total
Soil Science	284,174
Agriculture Biology	178,333
Plant pathology, Microbiology and Chemistry	132,038
Animal Nutrition, Food Technology	116,440
Seeds Technology	36,375
Data processing System	116,290
Total	863,650

The Laboratories shall support for the scientific development of the University besides rendering of services for the farming community. The implementation of these laboratories are highly justified considering that they are the base for the strengthening of the agricultural economy through improving of the quality and productivity based on techniques and products tested and/or adapted in the laboratories.

The dormitory for the students is added to this project which shall cover an area of 900m², with a cost of around R\$ 315,000.00

4.1.7 Strengthening of the Experimental Station at Gurupi

The most important support for the development of research works in the agriculture of the state are the experimental stations. For UNITINS, besides the support of research works, they are used as model farms where the students can have work training. However, restructuring of the two experimental stations of Gurupi, and Rio Formoso are considered to be essential for the effective functioning of these stations.

At present, the experimental station area of 64 ha is located in the urban sector of Gurupi, which has some negative conditions for the development of research and production such as entering the research areas and collection of research products before their evaluation. Therefore, the Gurupi research station may need an experimental area which will be located in the rural sector of the municipality.

There are many experimental cultivations which may be developed in the station, because it is located in the Cerrado area, where the activities such as beef and milk cattle, grain production as upland rice, corn and soybean, and other potential activities can be introduced such as vegetables and fruit farms.

The experimental station of Gurupi, linked to the University Campus, shall be in charge to supply information and define the technologies for the improvement of the existing agricultural activities of the region and also to promote the potential activities besides the teaching activities.

An area for the implantation of the experimental station, the physical structure, machinery, implements, facilities and utility vehicles shall be necessary.

The following strengthening activities need to be carried out in order to strengthen the activities of the experimental station at Gurupi

- Acquisition of experimental area
- Construction of necessary infrastructure
- Supply of machinery, equipment and vehicles
- Hiring of human resources
- Supply of consume material

A summary of the cost for carrying out these activities are shown below :

Land procurement cost = 200 ha x R\$450/ha = R\$ 90,000

Supply of machinery	R\$ 175,895.96
Supply of implements	R\$ 38,618.74
Additional Facilities	R\$ 215,514.54
Supply of Equipment	R\$ 43,764.20
Total	R\$ 563,793.04

4.1.8 Strengthening of the Experimental Station at Formosa do Araguaia

The Araguaia river valley is one of the most important regions of the agriculture production of the State, being remarkable for the rice, soybean, and corn cultivations which are developed in the municipalities of Formoso do Araguaia, Lagoa de Confusao and Pium.

The Experimental Station in Formoso do Araguaia was established by UNITINS in order to cover the research demand of the region through the development of genetic improvement, recommendation of cultivation technology, and pests and disease control.

The restructuring of the physical structure of this station is necessary to improve the research work environment, especially machinery, implements and facilities. The following strengthening activities need to be carried out in order to strengthen the activities of the experimental station at Formosa do Araguaia

- Restructuring of the existing facilities
- Contraction of firm for restructuring of the area (production area)
- Construction of infrastructure for implantation of confinement
- Reform of the existing machinery
- Hiring of Human resources
- Supply of vehicles

Reform of Machines and Accessories	R\$ 11,460
Reform of Facilities such as lab, lodging and shed	R\$ 13,537
Digging of Well	R\$ 16,000
Reform of stable, preparation of confinement project	R\$ 21,000
Reform of the production area, confection of trunks, reform of canal locks and corrals	R\$ 22,000
Acquisition of utility vehicles	R\$ 20,000
Total	R\$ 103,997

It is estimated that the total cost for carrying out all these activities of restructuring, repairing of machinery, construction of building for laboratory and supply of vehicles is R\$103,997.

4.1.9 Installation of Automatic Weather Stations at Gurupi and Rio Formosa

It is planned to install two automatic weather stations at Gurupi and Rio Formosa and the total cost for these two stations are R\$ 50,000.

4.1.10 Integrated Training, Promotion and Development of Technology Center for Fruit and Vegetal Farmers (NUTIFH)

NUTIFH is an extension activity of the University Campus of Gurupi - Agronomy Division, to be carried out in Palmas with the purpose of supplying service to the green belt farmers and surrounding areas (Porto Nacional, Paraiso, Miracema and others). Therefore, through the implementation of this program, the farmers may have the opportunity to know and adopt the technologies generated by the researches carried out in UNITINS. It is estimated that the total fund required for these activities is R\$151,930.

4.1.11 Summary of the Cost

To summarize the total cost required for all the activities mentioned above are as follows :

- 1) Strengthening and Expansion of the Gurupi Campus -
 - i) Expansion of Gurupi Campus - R\$ 7,129,787
 - ii) Laboratories (approximate) R\$ 863,650
 - iii) Dormitories R\$ 315,000
 - Sub Total R\$ 8,444,787

- 2) Strengthening of the Experimental Station at Gurupi
 - i) Land Procurement cost R\$ 90,000
 - ii) Strengthening of the Station R\$ 563,793
 - iii) Sub-total R\$ 653,793

3)	Strengthening of the Experimental Station at Formosa do Araguaia	R\$ 103,997
4)	Installation of Automatic Weather Stations	R\$ 50,000
5)	NUTIFH	R\$ 151,930
6)	TOTAL	R\$ 9,268,157

4.1.12 Proposal for the Creation of Animal Husbandry Department/Course

In UNITINS, although there are divisions on Agronomy and Veterinary Medicine in Gurupi and Araguaia Campuses respectively, there is no division or department or course on animal husbandry which is one of the most important subjects in the field of agriculture and livestock farming. The animal husbandry course includes the following working fields: Fodder Agriculture and Pastures (formation, management and recuperation), Animal Production, Nutrition, Animal Improvement and Processing of Animal Products etc. Because of the high potentiality for animal production in the Northern Region of Brazil, there is an increasing demand for the information and Professionals working in this area and the animal husbandry course will be able to attend these needs.

The Agronomy Course is traditionally one of the most expensive courses in this country and therefore, it is necessary to maximize the usage of infrastructure and personnel involved in these courses, beginning with combining courses connected to agriculture and livestock farming. The animal husbandry course would take advantage of existing structures, and laboratories and will require only some additional laboratories connected with livestock farming and the specialized personnel with expertise in these areas.

The courses of agronomy and animal husbandry have many similar areas and sub-areas not only in their technical and professional formation but also in their basic principles. In the agricultural research area, there are projects destined to animal production research such as fodder evaluation, pasture management and nutritional deficiency of extensively bred cattle.

UNITINS which is responsible for the execution of researches on agriculture and livestock farming of the State of Tocantins, became the first and the only university to participate in National System for Research on Agriculture and Livestock Breeding (SNPA), coordinated by EMBRAPA. All the projects sent to SNPA by Gurupi Center (1994/95), were approved.

It is to be emphasized that the Gurupi Campus which already has the Agronomy Course, presents technical and operational advantages for the possible implementation of an Animal Husbandry Course. It also becomes evident by the similarity of the minimum curriculum of the two courses required by MEC (Ministry of Education and Culture), and it brings the possibility of doing teaching and research with minimum number of

professors, and thus enabling to achieve the best efficiency in using funds. As an example of this similarity, we can observe the intimate relation between the areas of Animal Nutrition and Food Production. The later, just as the former, requires knowledge on soil, climate, general aspect of production, plagues and diseases etc., which are included in the minimum curriculum of the Agronomy Course.

Increasing interests in investments for agro-industries in the Central-South region of the State, as shown by examples of reactivation of slaughterhouse and opening/expansion of new industrial plants, will surely bring a growth of meat production (exportation and internal consumption) of the region, making an urgent necessity for the professionals.

Also, considering the dynamic functioning of the University, multi-campus structure of UNITINS permits us to conclude that favoring a certain isolated micro-region for the animal production sector shall be avoided. And, it is necessary to point out the fact that there is the biggest quantitative concentration of UNITINS courses in the Central-North region. A better distribution would reduce this concentration and promote larger interchanges between Gurupi and Aragua'na Campus through exchanges of experience and professionals, a better technical diffusion in the agriculture and livestock sector can be promoted in this way, not only for the cities related to South Region, but also for the whole State of Tocantins.

4.2 Strengthening of School of Veterinary Medicine of UNITINS

4.2.1 Background

The School of Veterinary Medicine plays an equally significant role in this field of Tocantins. In spite of the increasing demands for veterinarians, only one university has the School of Veterinary Medicine in Tocantins. Social demands for veterinarians are on the increase. To produce a skilled veterinarian with higher education and higher quality of practice, UNITINS must employ the modern equipment supporting UNITINS' s academic curricula and experiments. Only this can meet the growing demands for veterinarians.

In such a special field as a veterinarian, social demands are high. Especially, to increase animal production, there are boosting demands for veterinarians who can reproduce livestock. These kinds of requirements are segmented into technical personnel with capabilities of Artificial Insemination, Disease Control, Animal Treatment, Farmer Education, Drug Analysis, Public Health, Meat Inspection, Necropsy, Animal Attendant, etc.

Clinical field plays an important role in the education of veterinary medicine. It is not only the place for theoretical education but also the place for practical education. Therefore, Veterinary Teaching Hospital is indispensable for veterinary education programs.

The undergraduate degree course' s in veterinary medicine was established in 1992 in the UNITINS Araguaína campus. Today, the School has 23 professional teaching staffs

position and 48 technical and administrative staffs, and undergraduate students intakes 182 (including 80 women). The course covers 6 consecutive terms covering five years. School has a teaching hospital with 1,010 ha of total land area, of which 80 ha is a cattle farm and soon to be expanded as buffalo and swine farm, to promote neighboring farmers to provide new farming systems.

Although, in January, 1997, the first batch of 16 veterinarian students are graduated, but their employment condition's aren't clear. Because of the School of Veterinary Medicine facilities have been designed to handle former EMBRAPA equipment, instrument and machinery which are too old and out of date. The prevailing acute shortage in diagnostic material and consumable, and the confined space, have severely restricted the range diagnostic procedures each student can learn.

As a result, numbers of inadequately trained veterinarians are entering a job market, which is not expanding significantly. New graduate veterinarian's analytical and problem solving capacities have been seriously compromised as a result.

4.2.2 Justification

Today animal health plays an important role in accelerating the development of the livestock and poultry sector in Tocantins. Over the past years, it has been realized that the efficiency of the veterinary services in diagnosis, prevention and control of disease for all species of livestock and poultry are key element in obtaining the required increased productivity of livestock and poultry production. Animal health support to livestock and poultry farming systems are the most vital segment of planning.

Whereas, farmers easily learn by experience the technical of feeding and management in which they become self-sufficient, they need expert's help to specialized health services.

Today, the public demands an official and quality veterinary services as the livestock owners have realized the value of food animals and companion animals. UNITINS has strive to responsibly serve both state and private sectors by becoming a center for agricultural modernization and advancement.

UNITINS is the one of the newest universities in Brazil, Therefore, the Government puts the improvement of education status which has an economically immediate effect in Tocantins under serious consideration and has planned strengthening of the School of Veterinary Medicine which can be a base for promoting activity in animal health. The equipment, instrument and machinery are too old and out of date, they must be replaced by modern up-to-date ones in order that research and education of animal diseases.

Veterinary diagnostic services of the paraclinical studies would be upgraded with the purchase of new equipment and the provision of increased space to run commercially by providing diagnostic services on a free-paying basis and providing support services to the ambulatory clinic and the model veterinary practices.

4.2.3 Objectives

1. To provide equipment and expertise
2. To improve training equipment for students
3. To increase and develop human resources
4. Education of students on modernized techniques
5. The student enter the veterinary faculty after being accepted in the "high status"
6. To expand experimental farms for buffalo and swine
7. To promote new type of livestock production, buffalo and modernized swine production

4.2.4 Activities

1. Provision of equipment and facilities for improving the educational capabilities.
2. Education of students on modernized techniques.
3. Promote new type of livestock production to the farmers.

4.2.5 Technical Assistance

Technical assistance should also be provided to the School by an overseas institution experienced in the development of continuing veterinary training programs for practicing veterinarians. Such a program would become an essential element in providing the skills required in implementing the proposed changes.

4.2.6 Recommendations

The farming systems degree course curriculum would be expanded to include animal health in the animal production component of the farming systems course, and the facilities required to support an expanded and upgraded program, would be improved, including an expand library and experimental farms.

Direct student contact with the livestock industry from the farm to the consumer, in the delivery of services in clinical veterinary medicine and surgery, preventive medicine, farm management, laboratory management, production accounting and management, quality control etc. would be introduced or substantially expanded in the undergraduate course as well, as a means of increasing both the systems and service orientation of the thinking of all new graduates.

4.2.7 Estimated Cost

1) Provision of Equipment	R\$ 2,200,000.00
2) Establish Dairy Research Laboratory	R\$ 250,000.00
3) Expand Cattle Experimental Farm	R\$ 200,000.00
<u>Total</u>	<u>R\$ 2,650,000.00</u>

5 Human Resources Development Subprogram

As mentioned in section 3, 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. Therefore, in order to raise the technical level of rural producers, the strengthening of human resources development for these institutions is essential. Furthermore, with a view to introduce new agricultural techniques and to carry out smoothly organization of farmers and its management and to improve rural living conditions, the program will be proposed the following sub-sectors:

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

Implementation of the above subprograms will be carried out at the initial stage in the development plan ÓMaster PlanÓ. The implementation programs of thses programs are described as follows:

5.1 Vocational Training of Agriculture

5.1.1 Outline

The program with is formulated towards the development plan consists of the following two programs:

1. Strengthening of training programs for RURALTINS staff.
2. Strengthening of RURALTINS on-farm training programs and rural life improvement training programs for rural women.

5.1.2 Objectives

The objectives of the program are the improvement of rural producers and RURALTINS' s staff qualification. Furthermore, through the rural life improvement training for rural women, it is expected to stabilize rural life and to raise the social status of rural women.

5.1.3 Justification

At present, the agriculture and livestock activities depend on traditional techniques of cultivation and cattle raising. This situation constraints the increase in productivity and the introduction of new technologies. Furthermore, low qualification of extension staff generates distrust on technical assistance by farm producers. Therefore, by implementing this program, the strengthening of extension activities will be realized and smooth technical transfer to farm producers will also be feasible.

It will contribute to the increase in agricultural productivity, introduction of new crops, and promotion of stock raising. Besides, it is also aimed to improve the rural life conditions which, compared to those in urban areas, are very precarious. It is verified that the improvement of these conditions is hindered by the lack of community leaders despite the great demand by the rural population. These conditions can be changed with the community development attained through training courses for improvement of rural life conditions to be taken by women.

5.1.4 Details of the Program

(1) Strengthening of the training program for RURALTINS staff

The details of the program are composed of preparation of the training program for RURALTINS extension staff. The program will be implemented by the Demonstration Program (see section 4.4 of Annex XIII). The program will be carried out under the following classification.

- i) Preparation of the training program at professional upgrading level
- ii) Preparation of the training program at specialization level
- iii) Preparation of the training program at master degree level

The training programs i), ii) and iii) will be prepared in collaboration with EMBRAPA, UNITINS and other relevant institutions. The priority fields are:

- a. Methodologies of design on regional development plan, farm design, and farm management design, and technical and managerial evaluation of farming;
- b. Study methods on soil properties and identification of right lands for crop and fruit cultivation;
- c. Methods on mechanized cultivation for cereals and pastures;
- d. Technologies of prevention of soil degradation, preservation of the environment, increase of yield and improvement of quality, reduction of production costs, post-harvest technologies, animal hygiene, technologies on vegetables and fruit cultivation, and animals and poultry raising, and methodologies of maintenance and operation of irrigation facilities and farm machinery.
- f. Methods of establishment and management of farmers' organization, agricultural information system and market information, and method of rapid participative diagnosis; and
- g. Social assistance system and its evaluation, and technologies on rural life improvement.

(2) Strengthening of RURALTINS on-farm training programs and rural life improvement training programs for rural women

This program consists of preparation of the on-farm training program for farm producers by RURALTINS staff and rural life improvement training program for rural

women. The program will be implemented by the Demonstration Program. The priority fields are:

- a. Methods of mechanized cultivation for cereals and pastures, technologies on soil degradation prevention in order to allow the performance of sustainable agriculture, environmental preservation, increase of yield and improvement of quality, reduction of production costs, and animal hygiene;
- b. Post-harvest technologies;
- c. Technologies on vegetables and fruit cultivation, and animals and poultry raising;
- d. Methodologies on operation and maintenance of irrigation facilities and farm machinery;
- e. methods of establishment and management of farmers' organizations, and methods of farm household management and farm bookkeeping; and
- f. Rural life improvement (nutrition, health and hygiene, education, income generation, home economics, etc.)

5.2 Strengthening of Educational Institutions

5.2.1 Outline

The program is composed of the strengthening of agriculture vocational education institutions (high school level), towards to the development plan "Master Plan". The strengthening of two technical schools of agriculture and the establishment of a new one will be conducted in this program. The proposed schools are as follows:

- (i) Natividade Technical School of Agriculture and Livestock attached to UNITINS (existing) - South region
- (ii) Pedro Afonso Technical School of Agriculture of the State of Tocantins (existing) - Central region
- (iii) Araguaina Technical School of Agriculture and Livestock attached to UNITINS (new establishment) - North region

5.2.2 Objectives

The objectives of the program is in accordance with the vocational education promotion of agriculture which is one of the main policies of the country and the state agricultural sector. The strengthening of agricultural vocational education aims to increase the production, modernize the sector through the implementation of the Master Plan.

5.2.3 Justification

Among the existing technical schools of agriculture in the State, several differences were found as for the level of educational contents, teachers qualification, and availability of educational equipment and materials. All of them, however, in a higher or lower level, have difficulties. Low level educational institutions in this sector limit

the potentialities which could be developed by the integrated development plan of agriculture and livestock (Master Plan). Therefore, the strengthening of the vocational education institutions of agriculture and livestock, through the implementation of the program such as improvement of teachers qualification, implementation of curriculum towards to the regional agriculture, and provision of educational facilities, equipment and materials, will greatly contribute to the development plan of the State.

5.2.4 Details of the Program

- (1) Natividade Technical School of Agriculture and Livestock attached to UNITINS

This school will have a center position as for the vocational education of agriculture in the State, and the provision and renovation of the school facilities and educational equipment and materials will be planned.

- (2) Pedro Afonso Technical School of Agriculture of the State of Tocantins

This school will have a base of vocational education of agriculture for regional agriculture including PRODECER III, Central region, and the provision and repairing of school facilities and educational equipment and materials will be planned.

- (3) Araguaina Technical School of Agriculture and Livestock attached to UNITINS

Aiming to set a base of vocational education of agriculture for regional agriculture in the North region, this school will be newly established in Araguaina. The school facilities will be constructed at the site of the School of Veterinary Medicine, UNITINS.

5.2.5 Source for the Program

Investment Amount		Unit:R\$1,000	
Technical School	Const/Reconst. Costs	Educ. Equip. Costs	Total Amount
Natividade	681	1,010	1,691
Pedro Afonso	126	544	670
Araguaina	1,000	846	1,846

5.2.6 Implementation Schedule

The reconstruction of the mentioned two schools (Natividade and Pedro Afonso) will be implemented from the first year of this program on. The reconstruction works will be completed at the second year. Provision of educational equipment and materials and securing of qualified teachers will start at the second year.

Besides, the establishment program of Araguaina technical school of agriculture and livestock will be implemented based on a plan of new school establishment prepared by

UNITINS.

5.2.7 Implementing Organization

- (i) Pedro Afonso technical school of agriculture State Secretariat of Education and Culture
- (ii) Natividade technical school of agriculture and livestock UNITINS
- (iii) Araguaina technical school of agriculture and livestock UNITINS

5.2.8 Method of Fund Raising

The funds for this program will be raised by a loan of international financing institutions and subsidies from the federal and state governments. In the case of Araguaina technical school of agriculture and livestock, the funds will be raised by a loan of international financing institutions, subsidies from the federal and state governments, and funding support from FAET-Rural Syndicates.

5.3 Promotion of Farmers' Organization

In this program, promotion of farmers' organization in the Bico do Papagaio region will be conducted. In the future, further the program will make possible to diffuse the other regions in the State.

5.3.1 Outline

The program consists of three programs on the promotion of farmers' organization aiming to strengthen rural community in the Bico do Papagaio region (Extreme North region according to the administrative division of SEPLAN), which is one of the less developed in the State.

- (i) Strengthening of RURALTINS social assistance activities
- (ii) Promotion and activation of rural producers' associations
- (iii) Promotion of rural women organizations

5.3.2 Objectives of the Program

The program aims to promote the establishment of rural producers' associations which is being pushed forward by the Ministry of Agriculture, i.e., farmers' organizations formed by farmers who practice familiar agriculture, and activation of existing associations' activities. Furthermore, through the promotion of rural women organizations, it is foreseen the improvement of the social status of rural women and rural community life environment.

5.3.3 Justification

In the region, most of the people are landless and mini farmers, and it is verified a high

population density and poverty. Although most of rural people form rural producers' associations in the northern part of this region, most of them are only nominal one. In particular, farmers' organizations of small-scale farmers who live in the southern and eastern parts of the region are very few. Consequently, stabilization of rural life will be materialized through the strengthening of rural community such as formation of farmers' organization and its activation, and improvement of farming and rural environments.

The activities of the Bico do Papagaio Rural Women Workers Association (ASMUBIP) are prominent in the region. By diffusing these activities among rural women in the entire region, improvement of the social status of rural women will be foreseen.

5.3.4 Details of the Program

(1) Strengthening of RURALTINS Social Assistance Activities

Conditioned to the proposal of RURALTINS institutional reform, the program will be drawn up. The contents of the program include the preparation of the training program of farmers' organization and its implementation for RURALTINS staff, and the provision of equipment and materials for their extension activities.

(2) Promotion and Activation of Rural Producers' Associations

The program consists of the promotion of the organization of rural producers' association and activation of the existing ones. In the north area of the Bico do Papagaio, there are strong farmers' organizations, but the organizations of the middle east and the south areas are weak and few. Therefore, the promotion for the organization of associations and activation of existing ones will be planned establishing strategies to widen the concept of association.

- Promotion of establishment of rural producers' associations, and preparation of activation program and its implementation.
- Formation of central organization of the associations in the region

(3) Promotion of rural women organizations

Although there is already in the Bico do Papagaio a well-organized rural womens' association (ASMUBIP), the formation of women groups in the rural communities and the strengthening of their activities support will be planned. In the future, this program can be adopted in other regions of the State.

- Preparation of promotion program of rural women organization and its implementation.

5.3.5 Implementation Scheme

(1) Strengthening of RURALTINS social assistance activities

In this program, training courses based on the training program for social assistance staff will be implemented regularly at the central training center in Palmas.

(2) Promotion and activation of rural producers' associations

Following the program and schedule prepared, the promotion and activation of rural producers' association for farmers of rural communities and members of existing associations will be implemented by RURALTINS staff, members of the Lumiar Project, and APA-To staff.

(3) Promotion of rural women organizations

Supported by RURALTINS social assistance staff, members of the Lumiar Project, APA-To staff, and ASMUBIP staff, the promotion of rural women organization will be implemented in the rural communities where there is no organized women group. Also, the support by PACS agents will be expected.

5.3.6 Implementation Schedule

This program will be implemented from the initial stage of implementation of the development plan (Master Plan).

5.3.7 Implementing Organization

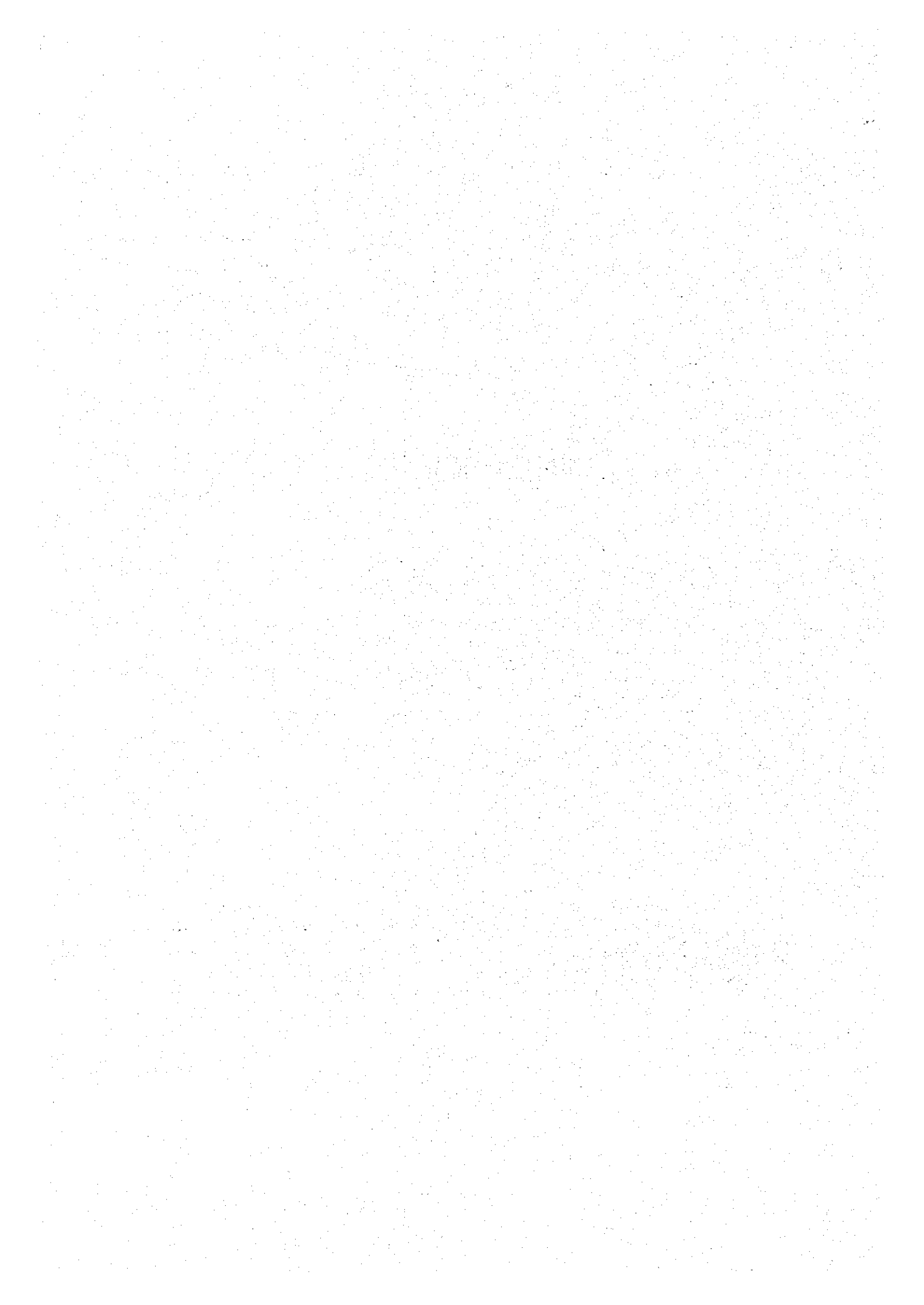
The RURALTINS shall be the agglutinating agent of the program implementation, working in cooperation with the associations, FAET, FETAET, INCRA-Lumiar and other related organizations.

5.3.8 Method of Fund Raising

The funds for the program implementation will be raised from the State budget (RURALTINS) and international NGO funds.

ANNEX XIII

**ENVIRONMENT CONSERVATION
PROGRAM**



ANNEX XIII

ENVIRONMENT CONSERVATION PROGRAM

1 Introduction

1.1 World Scenery of the Environmental Field

In the world scenery, there is a big concern about the causes of the environment quality deterioration such as earth heating, destruction of the ozone layer, desertification, saline soils, deterioration of soils fertility, clearing of forests, and lack of water. The crescent concerns about environment issues are increasing the expectation regarding the ecology preservation, since it is evident the constant aggression suffered by the natural environment.

The economic activities are aggravating the deterioration of the soil quality, specially the progress of agricultural activities in the last years represented by the "Green Revolution" which represented the increase of productivity of agricultural products through the use of agricultural inputs. Due to this situation characterized by the lack of respect and destruction of the environment, decisive actions may be taken in order to reverse such a situation, which tends to aggravate due to the rupture between man and nature, the first one becoming more and more apart from his bio-social condition, while integrated element of the planet and mainly responsible for the common future of the mankind.

Various meetings and congresses all over the world have been carried out in relation to these existing environment problems. In the meeting organized in 1987 by the World Committee of Environment and Development, the importance of sustainable development as a mean of food supply for the crescive world population and the provision of a solution for environment problems in the world scenery were discussed. The importance of the carbon dioxide gas control in order to decrease its density and avoid the heating of the earth was already announced in the summit held in 1992 in Rio de Janeiro.

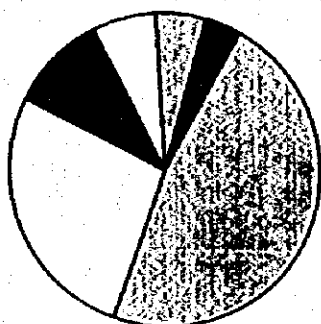
The earth-heating problem is a world concern and responsibility since each action taken by one country may directly affect the environment of other countries. According to some researches on the environment, the carbon dioxide gas level has increased from 275 PPM (200 years ago) to 375 PPM and it is considered one of the main causes of the earth heating. Brazil is in the fourth place among the producer countries of carbon dioxide gas, followed by the USA, China and Russia. The produced volumes are shown in the following table.

Carbon Dioxide Gas

	World	South America	Brazil	USA	Japan
Total of CO ₂	26,443,072	2,404,932	1,317,073	4,881,353	1,093,470
Burning of Solid Combustible	8,588,416	67,883	39,875	1,786,167	317,790
Burning of Liquid Combustible	9,050,080	375,413	153,492	1,986,042	622,294

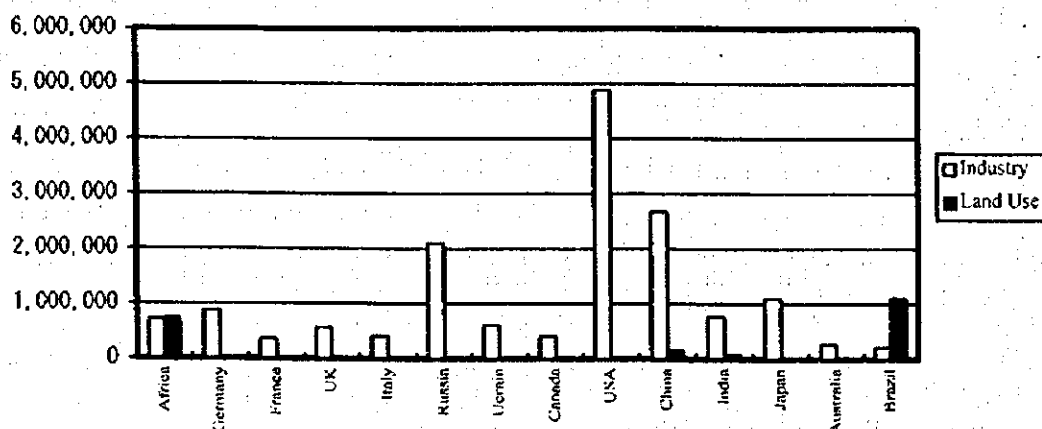
Burning of Gas Combustible	3,828,880	116,862	8,028	1,065,227	108,191
Gas	249,152	17,367	1,674	8,973	0
Concrete Industry	626,544	27,407	14,004	34,944	45,195
Total of the Industry	22,343,072	604,932	217,073	4,881,353	1,093,470
Burning for use of soil	4,100,000	1,800,000	1,100,000	0	0

Source: Carbon Dioxide Information Analysis Center



The main carbon dioxide gas producers by means of forest burning for use of lands are shown in the left figure. Brazil is in the first place representing 26.8 % of the total carbon dioxide gas produced. This value exceeds all volume produced by the industries in Japan. These activities are mainly developed in the Amazon region, including the state of Tocantins.

The carbon dioxide gas sources in the main countries are shown in the following table.



The carbon dioxide gas produced by forest burning for agriculture use represents more than 80% of the carbon dioxide gas produced in Brazil and is higher than all volume produced in Japan. Considering this fact, it shall be important to develop control measures for burning activities in order to contribute to the improvement of the environment. Besides, there is a necessity to find a suitable method for the stimulation of the sustainable development, through new techniques that may supply the necessary food avoiding the destruction of environment.

1.2 Land Clearing by Burning

1) Practice of "Queimadas" (Land Clearing by Burning)

Man is the main cause of the forest fires. Man starts fires for very different reasons: for hunting, in war, to clear land, to ward off ferocious creatures, to facilitate honey

collection, to open thoroughfares in forests, and for agricultural purposes.

Fire causes various types of damage to the trees in the Cerrado, from the wilting and loss of leaves in their canopy, to the death of their branches and trunks. Consequently, frequent "queimadas" may very well hinder the growth and development of Cerrado trees, and progressively reduce their number, in this way, the thickly wooded Cerrados are opened up, and replaced by less dense "Campo Sujo" (dirty field) and eventually "Campo Limpo" (clean field) formations.

Cerrado trees are characterized by their tortuous appearance which may be attributed to the death of the terminal buds which are most exposed to the fire. The lateral buds survive and grow, and thus give the trees their twisted appearance. Branches and trunks that are protected by a thick covering of cork are not thus affected. "Queimadas" also harms the flora indirectly when they leave the soil bare, especially in the rainy season, causing increased surface run-off and reduced infiltration, loss of the ash that is washed away, and erosion of the soil causing sedimentation of water courses.

Certain species, however, appear to have adapted to fires. Thus, the speed and the vigor with which some species produce new buds following a "queimada" is quite surprising. Indeed, many begin the re-budding sequence by producing flowers, especially in the herbaceous lower bushy stratum. Another factor, which may be correlated with fires is the dehiscence of fruit and seed dispersal. Once the fruits are opened by the heat and flames, the dispersal of seeds by the wind is facilitated, especially since the vegetation and straw material that had accumulated prior to the fire has been burnt off.

Fire may also stimulate germination by provoking changes in the seeds protective casing, and facilitating the entry of water, or by burning off the fallen leaves which may contain certain germination inhibitors. Some seeds respond positively to thermal changes, and germinate readily. Heringer (1971) noted that many seeds germinate after a "queimada", but that repeated annual "queimadas" tends to destroy the emerged plants.

Meguro (1969) conducted a physiological study at the sape grass (*Imperata brasiliensis*) in which he noted a floral response immediately after a fire, regardless of the time of the year. If the leaves are cut back, flowering also occurs, although the response is less intense than that provoked by fire. From this, he suggested that fire may perform a dual role; it eliminates the leaves and a possible flowering inhibitor present in them and because of the effect of the heat, inhibited the formation of a hormone that induces flowering.

2) Fauna

Little work has been done on the influence of "queimadas" on vertebrates. It is assumed that most of the animals escapes to the lowlands and gallery forests, or that they hide in holes in the ground or, in the case of birds, that they fly away to safety.

The relationship between animals and fire is somewhat dolorous, but not unnecessary. The places which most vertebrates had previously used for shelter, tend to be wiped out. The fire moves swiftly across the land, burning all biomass, and destroying or exposing their refuges, making them vulnerable to be captured by man or other predators. In this process, many species of the Cerrado fauna have become threatened with extinction, or have had to adapt to other biographic systems. Fires, however, also have beneficial consequences for herbivorous species. It has been shown that fires promote regrowth. Thus they provide the surviving fauna with vegetation that is tender, and rich in nutrients that the roots have drawn from the ashes.

3) "Queimadas" in Tocantins State

"Queimadas" are one of the features of Tocantins State, and are most evident in the months from June through October. Their purpose is obvious; to clear the remaining vegetation in deforested areas, dispose of crop residues and to clean pastures of dry, fibrous grass that is of little use for grazing. It should also be mentioned that there are people who derive enjoyment from seeing the forests burning into flame, and the Lajeado Range is often the subject of their attention, especially in the dry months when, from Palmas, a line of fire, kilometers long, can often be seen.

According to the data from the National Institute for Space Research (INPE) and PREFOGO/IBAMA using satellite Imagery from the NOAA satellite, Tocantins has been classified as one of the three states with the highest incidence of heat foci in the years 1990-1996, with the exception of 1993, when it come in fourth (refer the table).

An analysis of the heat foci observed in the State of Tocantins shows that their number is diminishing over the years. The suggestion presented here is that this diminution can be attributed to the economic factors, particularly the shortage of capital, which has afflicted rural producers, and low technological uptake. Over the past decade, as part of the efforts to reduce still further the incidence of "queimadas", and to change current practices, government environmental agencies (IBAMA and NATURATINS) in partnership with NGOs and trade unions have conducted educational campaigns involving speeches, puppet shows in schools, sketches on TV and printed leaflets, posters etc.

Table XIII-1.2 Heat Foci in States of the Northern Region, in 1990-96

State/Year	1990	1991	1992	1993	1994	1995	1996
Acre	708	529	191	435	248	96	20
Amapá	182	95	0	05	01	07	06
Amazonas	783	1265	871	2038	3770	593	91
Maranhão	70410	56814	16635	14190	2983	11846	2103
Pará	14495	43103	27718	15507	12180	11814	7977
Rorônia	6058	17878	4997	7529	5651	7252	1211
Roraima	-	-	-	-	-	-	0
Tocantins	73029	80913	28210	18338	10528	15809	4318

Source : PREFOGO/IBAMA, Instituto Nacional de Pesquisa Espacial- INPE.

By law, the practice of "queimadas" may be undertaken provided legal restrictions,

contained in Laws No.4,771, dated 15/09/65, No.6,938 dated 31/08/81, Articles 2 and 14 and the Brazilian Penal Code, Article 250, are obeyed, and the required authorization for a "Controlled Queimada" is given by the competent agency. Costs of this authorization currently stand at R\$3.00 for areas up to 13 ha, and for areas larger than this the charge increases by R\$3.00 for each additional hectare burned. There have been cases of people wrongfully using "queimadas" to clear more than 50% of their properties.

Authorizations are issued at the IBAMA offices in 8 localities: Palmas, Arraias, Dianópolis, Tocantinópolis, Araguaçu, Araguaatins, Gurupí and Araguaína. Each of these encompasses a radius of approximately 280 km. The system is unable to cover the more distant townships, which makes authorization there difficult. Another relevant factor is that small holders consider authorization to be an expensive burden.

According to an IBAMA official in the State, there are few requests for copies of the "Terms of Responsibility and Permission for Controlled Queimadas". In 1995, 37 authorizations were issued, covering a total area of 2,883 ha and 48, in 1996 for a total area of 3,571 ha of which 50% were undertaken to clear pastures.

Restrictions on the use of fire are also imposed by financial organizations that operate in the agricultural sector, such as the Banco da Amazonia S.A, which may insert special clauses prohibiting the use of fire for land clearance or the clearing of pastures.

Rural small-scale producers know through practice, that "slash and burn" - deforesting an area then burning it clear - can yield good harvests, with fewer pests and diseases. But they also know that it is periodically necessary to open up new areas on where to grow crops, because the land soon becomes weak. It is then abandoned and secondary vegetation covers it. In short, a form of rotational farming occurs.

Some people have attempted to improve the management of their pastures by restricting the frequency and intensity of "queimadas" so as to maintain soil fertility. Fire is not necessary every year, what dictates whether you need it or not is the state of pastures. Coutinho (1993) suggests that Cerrado areas need 3 years to replace the nutrients lost in "queimadas". The subject is still inadequately documented, and one of the factors, which hinder this is the sheer size of the Cerrado domain, and its wide variation in latitude (Latitudes of 4 -25 N).

One point worthy to note is the fact that Man can only create an appropriate habitat by acting directly on his surroundings, transforming his space to ensure his survival, and being aware of this process. Different forms of relationship between Man and ecosystems have been observed through out history. The current development model, founded on the rationalization of maximum profit and short-term economic surplus, has been severely detrimental to ecosystems because of the scale of Man repeated intervention, and the intensification of the rhythm of resource exploitation and consumption, denying the natural cycles and the environment regenerative capacity. Ecosystems, however, provide the physical support that is essential for the whole

productive system, and the growing awareness of this fact may have a transforming influence, working to promote a new set of social and cultural values, associated to communal practices of natural resources use.

(3) Agricultural Development and Environmental Conservation

Environment in the sense of conservation or natural environmental preservation has various aspects. Considering agriculture and animal husbandry, the environmental problems are local pollution with heavy metals, river water pollution by pesticides and livestock excreta, eutrophication of river by inflow of soil organic matter and chemical fertilizers, soil erosion caused by unsuitable soil management.

With regard to global environmental problems, the main concern is about the loss of bio-diversity through deforestation and burning fields, and other problems such as global warming and destruction of atmospheric ozone layer which are caused by increase of CO₂, N₂O, CH₄ in the atmosphere originating from deforestation, burning fields, too much use of chemical fertilizers, etc.

Environment preservation is defined as actions which human beings can carry out positively upon nature conservation. However, in this sense, agriculture and animal husbandry may mean the destroy of natural environment. Nevertheless, human beings must live and enrich their life, and deservedly needs the agricultural development.

Therefore, the agriculture and animal husbandry should control positively the environmental degradation through the introduction of the sustainable agriculture, the efficient live stock raising, introducing improved races and advanced raising methods, and with sucraplus management to minimize the load for the environment.

2 Contents of the Program

The State of Tocantins, as a State owner of abundant natural resources has great possibilities to contribute with two important aspects of the world scenery through the decreasing of environment deterioration and improving of food supply. On the other hand, as the State is in a development stage and needs economic resources, and increasing of investments especially in the private sector is need in order to reach a sustainable development.

These contributions may be carried out through the introduction of the Environment Preservation Program composed by the following programs:

Action	Contents
(PRESERVATION OF ENVIRONMENT)	
Control of Burning	<ul style="list-style-type: none"> To supply credit lines for the project elaborated for the control of burning.
Sustainable Forestry	<ul style="list-style-type: none"> To supply credit lines for Reforesting Investments
Environmental Education	<ul style="list-style-type: none"> To implement action for the Environmental Education and

	reform the necessary infrastructure for this activity.
Establishment of an Environment Monitoring System	<ul style="list-style-type: none"> • To implement Environment Monitoring Actions and reform the necessary infrastructure for this activity.
(GREEN VILLAGE)	
Environmental recovering of deteriorated areas	<ul style="list-style-type: none"> • To supply credit lines for farmers, specially in the areas in need and for mini producers for fixed investments that may contribute to the improvement of the environment.
Promotion of Sustainable Agriculture	<ul style="list-style-type: none"> • To supply credit lines for introduction of sustainable agriculture activities.
Promotion of an Improvement System of the Seeds and seedlings Distribution.	<ul style="list-style-type: none"> • To supply credit lines for farmers and rural associations who contribute with the improvement of the seed quality and the seedlings distribution system.

The program shall be implemented in two modalities: Public Investment (Dark Part) and Private Investment taking into account the characteristics of each action.

The actions to be implemented through the private sector are mainly fixed investments such as purchasing of equipment necessary to develop the actions aiming at the year 2015. The investment stimulation of the private sector shall be implemented through credit system for farmers with favorable conditions to attract investors.

The State of Tocantins is the holder of reach natural resources, however due to the lack of investment capitals for the development of the territory, it is necessary to find out methods to promote investments of the private sector. In spite of the existence of credit lines system for farmers supplied by the Federal Government, they are not sufficient to be utilized as development strategy, especially in the state of Tocantins where the training of farmers was deficient in the past.

The strengthening of farmers, specially their capitalization is limited by only utilizing the credit supplied by the Federal Government. It is necessary to create a credit line favorable to investors (existing farmers and the new incorporated ones) in terms of repayments.

On the other hand, the state shall be ready to adopt new development methods, especially in the food production area, in terms of sustainable development. At present, there are many problems such as uncontrolled burning, uncontrolled exploration of lands, etc. mainly because of the lack of farmers training. Considering the world food balance scenery, now shall be a proper moment to promote the preservation of the environment and reach a sustainable development, maximizing the resources in the long term, in terms of improvement of the State economy.

The state may reach the following results through the application of capital resources in actions for the promotion of production and preservation of environment.

- (a) Sustainable Development, maximizing the utilization of natural resources;

- (b) Activation of the Economy through the increment of investments in the agricultural sector;
- (c) Improvement and Preservation of Environment.

2.1 Environment Preservation

In spite of the large available lands, the majority of them were already explored in the past turning the vegetation scarce. Savannah, type of vegetation very sensible to environmental changes, covers the majority of the state land. The main environment problems found in the state are caused by burning practices in the whole state, gold mining in the south region and the occupation carried out in the 70's without previous planning.

The major part of the state is utilized for pasture, developing extensive cattle activities with low productivity. The burning activities are developed for the maintenance of those pastures, causing damages to the natural cover of Savanna (Cerrado) besides the problems caused to the population health.

The number of burned pastures occurring each year is more than 80.000, covering large areas of the state territory with a dense smoke, decreasing the visibility and increasing the diseases probability. Sometimes, the purpose of fire is very simple, for example, maintenance of roads, prevention of animals' attack, etc. Besides, there are others serious problems such as deforesting, pollution of cities, etc. Considering this background, the preservation of areas, which are still in the original state, is very important. The present program is composed of the following components;

- (a) Sustainable Forest Management
- (b) Control of Fires
- (c) Environmental Education
- (d) Establishing of an Environment Monitoring System

The improvement and preservation of the environment as well as the reduction of pollution factors in the State of Tocantins is planned to be carried out through the implementation of actions contributing to the improvement of the environment in the world scenery.

2.2 Green Village Project

The present program has as main objective to conserve the Cerrado environment through the definition of agriculture development models according to the characteristics of each region. Basically, this project foresees the enlargement of green areas together with the number of farmers of the region. In spite of the large quantity of available lands, the majority of them were already explored in the past. The majority of the state land is covered with Cerrado, type of vegetation very sensible to environment changes.

The project is composed of the following items:

- (a) Rural Environment Improvement in the Environment Degradation Areas
- (b) Distribution of Seeds and Seedlings
- (c) Sustainable Agriculture Model

This project aims at the creation of model areas with the viewpoint of the environment preservation, extending that experience to the neighbor areas, attaining the environment improvement in the state.

2.3 Implementation Methodology

The Programs aims at the strengthening of the environment control actions and improvement of the production conditions of farmers. The expected results through the implantation of the project are the following:

Direct Results	
General	<ul style="list-style-type: none"> • Procurement of Cheaper External Resources, saving the State Funds
Public Investments	<ul style="list-style-type: none"> • Improvement of the Infrastructure destined to Environmental Education, Monitoring System and Demonstrative Fields.
Credit Lines	<ul style="list-style-type: none"> • Improvement of the Environment Conditions (reduction of burned and deforested areas and also the reduction of problems caused by agriculture defensives) • Enlargement of the forest area • Capitalization of farmers through profitable credit lines • Increase of Agricultural Production • Increase of possibilities for the introduction of new technologies aiming at the sustainable agriculture.
Indirect Results	
General	<ul style="list-style-type: none"> • Substitution of the Federal Government Intervention in the strengthening of farmers sector.
Public Investment	<ul style="list-style-type: none"> • Improvement of the Environmental Education through the creation of awareness regarding its importance for the environment preservation. • Improvement of the Environment Monitoring System, creating the possibility to reduce damages produced by the environment deterioration • Training of Public Officials • Improvement of the Research System to strength the extension and instruction of farmers.
Credit Lines	<ul style="list-style-type: none"> • Reduction of the Social Disparities • Improvement of the farmers life conditions • Attraction of new investors • Activation of the State Economy

As a sub-product of this program, a contribution shall be given to the following aspects;

- (a) Improvement of the Environment at the World level, especially in relation to the earth heating problem, through development of actions that may reduce burning activities.
- (b) Increasing of food supply in the International Market through the increment of exportable commodity production.

The basic strategy of the program is to utilize the private sector energy, promoting farmers' investments in order to reduce state expenses and completing the actions necessary to reach a sustainable development through the investment of the public sector.

2.4 Environment Improvement Method

It is necessary that the public and private sectors take some measures in order to improve the environment conditions. Considering the difficulties faced by the private sector to invest in actions related to environmental issues, profitable credit lines shall be introduced in order to stimulate investments in this field. On the other hand, the public sector may develop and establish actions for the preservation of the natural resources. These actions may be executed through education and environmental monitoring which may control irregular activities.

3 Environment Conservation Program

(1) General

The State of Tocantins is located in the "Entrance door" of the Amazon and is considered a linking corridor between the North and Northeast and the Center South of Brazil. The Tocantins has played the role of a "tampon area" of an important section of the amazon forest oriental portion and is suffering strong pressure from economic and demographic occupation fronts coming from the South and Northeast. However, the State of Tocantins has still very precarious natural resources basis from the economic production point of view, being verified a predominance of Cerrados.

The Agriculture of Tocantins is originally characterized by traditional production methods conditioned by climatic factors. This tendency leads to a situation in which the most explored cultures in the State do not reckon on adequate technologies in relation to the productivity not no mention the issues related to the environment.

Cattle raising is one of the main economic activities in the State, mainly because of beef cattle breeding which guarantees the supply for the State, besides the exportation to other markets. The bovine cattle is raised through an extensive system, with low technology level, utilizing natural pastures and reduced number of man power, lowering the production costs.

Legacy of the past, the disordered occupation of Tocantins is partly attributed to the large extension of the former State of Goiás, considered as one of the contributor factors for the precarious environmental management of that area. The State of Tocantins, likewise other Amazon states, is facing difficulties and structural limitations to give priority to the environment conservation in the same level of importance given to the productive sectors, in special those which cause more impact over the environment.

The disordered growth of the State is causing environmental problems. The Government, community and environmental organizations may take prevention measures in order to preserve and conserve the natural resources of the state. In order to promote environment preservation actions, the Sub-programs are planned not only to improve the environment situation of the state but also the world scenery through the reduction of burning actions in the state. The activities of these Sub-programs are related to the control of burning activities, recovery of degraded areas, etc., to be attained through joint actions. The activities of the Sub-program are the following:

(CONSERVATION OF THE ENVIRONMENT)	
Sub-Program	Activities
Control of Burning Activities	<ul style="list-style-type: none">• Incentive to burning control activities• Extractive activities
Forest Management	<ul style="list-style-type: none">• Incentive for Reforesting• Incentive for Forest Management• Incentive for recovery of Degraded Pastures• Incentive to the Agroforest system
Environmental Education	<ul style="list-style-type: none">• Environmental Education Activities

	<ul style="list-style-type: none"> • Creation of the Environmental Education Center (UNITINS) • Agroecology Experience Center (SAG)
Establishment of an Environment Monitoring System	<ul style="list-style-type: none"> • Monitoring of Burning Activities • Construction of the Central Laboratory (UNTINS) • Installation of Agrometeorological Observation Networks • Monitoring of Water Resources and Land Use • Studies for the creation and utilization of Conservation Units (CU)

(2) Objective of the Program

This Programs aim at contributing to the improvement of environmentally degraded areas of Tocantins through the implementation of joint actions. The following results are expected through the implementation of this Program;

1. Reduction of unnecessary burning through the introduction of Incentive for the control of burning activities;
2. Recovery of degraded areas;
3. Enlargement of Green Areas in the State of Tocantins;
4. To create awareness about the activities responsible for the environment deterioration;
5. To control the activities responsible for the environmental deterioration.

3.1 Forest Management

(1) Contents of the Project

This project aims at increasing the forest areas through the provision of credit lines to farmers who want to increase the green areas or maintain the native forest as natural reserves. This Sub-program will be implemented through the following actions;

1. Incentive for Reforesting of degraded areas
2. Incentive for Forest Management
3. Incentive for the recovery of degraded areas
4. Incentive for the Implantation of Agroforest Systems

These actions shall be promoted by the private sector, through credit lines.

(2) Objective

This project has as purpose the increase of green areas in the State of Tocantins. The specific objectives are as follows;

1) Incentive for Reforestation

The specific objectives are as follows

1. To enlarge the forest areas with native and exotic varieties
2. To find a development alternative through Forestry activities
3. To reduce the burning actions carried out by cattle raisers through the introduction of

forestry

4. To preserve the natural resources in the long term through reforestation

2) Incentive to the Forestry Management

This action has the following specific objectives;

1. Recovery of degraded forests;
2. To utilize the forest resources and use them as income source for farmers;
3. To propitiate the permanence of the Man in the countryside, in a productive way;
4. To stimulate diversification of activities; and
5. To activate the economy through forestry.

3) Incentive for the Recovery of Degraded Pastures

This action has the following specific objectives;

1. To improve the pastures conditions through the control of erosion;
2. To upgrade soils fertility conditions through the consortium of grass and leguminous;
3. To promote crops rotation.

4) Incentive for the Implementation of Agroforest Systems

This action has the following specific objectives;

1. To promote the utilization of natives species with the introduction of forest essences, fruit essences, vegetables and grains;
2. To improve farmers income through the introduction of sustainable production system;
3. To diversify the agricultural activities.

(3) Justification, Background and Necessity of the Project

Brazil is the country with the largest Tropical Forest in the World but also the country with the largest deforestation area as a consequence of the lack of governmental action in order to regulate the forest exploration process. In Brazil, the Forest Management is still in an incipient stage, fact that, associated to the lack of knowledge about the complexity of the amazon forest ecosystem and lack of research and incentive for the implementation of a sustainable forest policy, contributes to an irrational and disordered exploration of the forest resources.

In the State of Tocantins, the North and Extreme North regions have suffered, during the 70's and 80's, an intensive deforestation process stimulated by the proximity to the BR-153 Belém-Brasília highway, becoming a main wood supplier for the Brazilian Center-South region and therefore being the Legal Amazon State with the smallest area of Ombrophile Dense and Open Forest.

In the State there is no native trees reforestation program. In the areas with predominance of Cerrado, besides cattle raising, the production of vegetal coal is the most serious threaten for the preservation of this typical natural formation, rich in forest

species and even more in wild fauna.

The forests supply the most valuable products of the market, wood, which is going through a permanent and systematic predatory process. It is verified that in areas such as Jalapão, reforestation programs with exotic trees such as Eucalypt are being implanted. Due to the lack of reforestation actions the following problems have been emerging;

1. Indiscriminate Wood Extraction in the Cerrado for production of coal;
2. Increasing of rural population poverty;
3. Loss of biodiversity;
4. Silting up of water sources;
5. Erosion and lixiviation of soils;
6. Alteration of the regional micro climates;
7. Compacting and impoverishment of soil, leading to desertification;
8. Migration of Fauna; and
9. Modification risk of genetic sources.

Recovery of natural resources after their alteration is extremely difficult. Therefore, the implementation of urgent actions for forest preservation and monitoring is recommended.

1) Incentive for Reforestation

The Tocantins State, despite the existence of large potential areas for forestry which is estimated in about 230.000 km², up to the present reckon only on few investments in this field due to the lack of knowledge and incentives. The State shall make use of these areas in order to increase the economic activities of forestry which production, if well conducted, does not damage the environment, specially in marginal areas. The marginal areas or unsuitable for cultivation are basically found by the high declivity hillside. Therefore, it makes sense to use these areas for reforestation. The preservation of river margins through a forest cover prevents the erosion caused by intense rain transforming fertile soils into degraded areas not easy to be recovered.

The wood extraction activities continue to expand over the Cerrado and Humid Tropical Forest, being detected even the disappearance of economically important species in both biomes. The reforestation areas of the state may be increased through Incentive to farmers.

2) Incentive for Forest Management

In the State of Tocantins, all rural properties are enforced to maintain at least 50% of their area covered by forest because their location inside the Legal Amazon region. However, in spite of this regulation it is hard to find original forest areas corresponding to the established percentage. However, with the introduction of Forest Management, the farmers can attain several advantages; legalizing his situation, protecting the soil against erosion and utilizing marginal areas, reckoning on several lucrative possibilities.

Within the State of Tocantins, specially in the Humid Tropical Forest areas, native species economically important such as chestnut tree and mahogany are found. However, with the recent occupation wave, these areas are under intense and permanent exploration process of basic natural resources, specially the forest because it contains the most important raw-material of the region, the wood. Besides, the extension cattle raising system is also developing deforestation due to its demand for large extensions of pastures.

On the other hand, in a smaller scale, deforestation is also caused by the development of agriculture for subsistence and by commercial agriculture with low technological level. Through this process, the Cerrado is being replaced by pastures or low profitable agriculture areas.

The experience in already consolidated occupation areas, in the Amazon, indicates an evolution tendency in terms of economic development more compatible with the required sustainable use of natural resources. The emerging of agricultural-forestry production system, is today a reality among farmers.

The large pasture areas utilized for cattle raising located within the Babaçú forest are being dominated by this species, thus it is very important to find an economic alternative for the utilization of these natural resources.

A Babaçú reserve may be created, considering that the nut of this palm can be industrialized for the extraction of oil and from the mesocarp, a rich nutritional complement is extracted. The production and commercialization of babaçú processing products are being procured by the ASMUBIP - Association of Women Coconut Breakers of Bico do Papagaio. The farmers of these areas are pushing for the deforestation of Babaçú forests. In creating incentives for the utilization of this resource in the production of vegetal coal, actual alternatives for the utilization of Babaçú could be created.

3) Incentive for Recovery of Degraded Pastures

A disordered exploitation process was carried out together with the expansion of the "agricultural frontier", specially caused by the unsuitability of the adopted productive process to the natural characteristic of forest. That disorder has significantly modified these areas leaving them in high degradation level.

It is estimated that the extensive cattle raising activities occupy approximately 1/3 of the State, with a field capacity of 1 head/5ha, resulting in a very low productivity. The low technological level employed by the familiar agriculture, even in the rural settlements, is also leading to the extensive use of land and forest, damaging the environment and reducing the productive capacity of the resources.

This action do not cover a defined area of the State concerning to forest formation type,

but regions with occurrence of high forest density, where the native vegetation was replaced by cultivated pastures which however became non productive due to inadequate management. It took place in the Dense and Open Ombrophile forests, Dense Savannah forest and Semideciduous Seasonal forest.

4) Incentive for the Implantation of Agro-forestry System

In poor soil areas, the monocultures, particularly the annual cultures, are not sustainable, because they do not allow the maintenance of soil productive potential, on the contrary causing a serious reduction of its properties in a relatively short period - 2 to 3 years.

One of the possibilities to reverse this situation is the adoption of Agroforest production system, in order to recovery degraded areas and diversify the land use aiming at the improvement of the productive capacity. This is an associated land use system in which different temporary or perennial cultivation or only perennial cultivation can be jointly developed.

Syringes and Chestnuts trees areas, and areas with predomination of babaçú palm trees make possible the introduction of cultivation where the babaçú itself is a component of the productive system. Furthermore, besides promoting the maintenance and recovery of the vegetal coverage, these consortiums become an economic alternative for the region traditional population, ensuring the maintenance of appropriate production and productivity level in a sustainable way.

(4) Details of the Project (Dimension, Location, Required Investment, and Others)

1) Incentive for Reforestation

This action is recommended for Open Arboreal Savannah (Cerrado field), being preferably destined to wood and coal consumers and also farmers. In the areas covered by Arboreal Grassy Savannah (Clean field), it is necessary to carry out research to study the origin of forest species, in order to establish the parameter for the introduction of species in the region.

The reforestation plans shall be financed to individual or associations. The eligible items are as follows;

Fixed Investment	<ul style="list-style-type: none"> • Area reclamation (clearing, liming, plowing and leveling) • Installation and Cultivation (marking/signing, opening of furrows and fertilization, planting/replanting) • Supply of Seedlings • Planting Materials (defensives, lime, sulfate, superphosphate and chloride)
Semi-fixed Investment	<ul style="list-style-type: none"> • Agricultural management practices in the first three years (clearing of the area, crowning, coverage manuring) • Phitosanitary practices during the first three years (combat against Saúba and plagues)

The financing is estimated for areas of approximately 10,000 ha, as the first stage, requiring an investment of about R\$ 10,000,000 (with an implantation cost estimated in R\$ 1,000/ha)

2) Incentive to the Forest Management

The reforestation plans shall be financed to individual or associations. The eligible items are as follows;

Fixed Investments	<ul style="list-style-type: none"> • Seedlings • Planting Materials (defensives, lime, sulfate, superphosphate and chloride)
Semi-fixed investment	<ul style="list-style-type: none"> • Agriculture Management Practices during the first three years (clearing of the area, crowning and coverage manuring) • Phitosanitary Treatments during the first three years (combat against Saúba and plagues)

The financing is estimated for an area of approximately 10,000 ha, as the first stage, requiring an investment of about R\$ 5,000,000 (with an installation cost estimated in R\$ 500/ha)

3) Incentive to Recovery Degraded Pastures

The methodology of this action consists in the planting of various forest species seedlings, without previous clearing of the area, the type of species varying according to the region. The recommended forest species are Mahogany, Cedar, Jatobá, Axixá, freijó, Bacaba, Angelim, çupuaçu and others

Financing through the reforestation plan shall be supplied to individual farmers or associations. The eligible items for financing are the following;

Fixed-Investment	<ul style="list-style-type: none"> • Land reclamation (clearing, liming, plowing and leveling) • Installation and Cultivation (marking/signing, opening of furrows and fertilization, planting/replanting) • Supply of Seedlings • Fencing • Planting Materials (defensives, lime, sulfate, superphosphate and chloride)
Semi-Fixed Investment	<ul style="list-style-type: none"> • Agriculture Management Practices during the first three years (clearing of the area, crowning, and coverage manuring) • Phitosanitary Treatments during the first three years (combat against Saúba and plagues)

Financing is estimated for an area of approximately 50,000 ha, as the first stage, requiring an investment of about R\$ 10,000,000 (with an installation cost estimated in R\$ 200/ha)

4) Incentive for the Implementation of Agroforest System

This action shall be implemented in Legal Reserve areas, which are considered non productive by their owners. Through the implementation of the Agroforest systems they shall become productive and also shall be less exposed to degrading actions. The methodology may consist in the implantation of commercial forest species, fruit species or others without suppression of the native forest.

For the implementation of this program, it is important to carry out previous studies and consults to EMBRAPA and UNITINS considering that these institutions already have studies in similar forest areas. It is recommended the utilization of a methodology adapted to the region conditions. For instance, the *Hevea brasiliense* (Syringes) is the species recommended to be implanted in the north and extreme-north regions of the State. The implementation of this action shall be very important for the preservation of areas with remaining native forest and also for the control of burning activities.

The following consortiums can be implanted;

1. Consortium Babaçú x Cupuaçú x Bacaba x Cajú x Ingá
2. Consortium Babaçú x Bacuri x Ipê x Mogno x Parica x Ingá
3. Consortium Babaçú x Cacau x Açai x Pupunha

Financing through the reforestation plan shall be supplied to individual farmers or associations. The eligible items for financing are the following;

Fixed Investment	<ul style="list-style-type: none">• Planting• Construction of Production Facilities• Construction of Nurseries
Semi-Fixed Investment	<ul style="list-style-type: none">•

Financing is estimated for an area of approximately 10,000 ha, as the first stage, requiring an investment of about R\$ 5,000,000 (with an installation cost estimated in R\$ 500/ha)

(5) Implementation Method

These actions shall be implemented through the credit system for farmers, with favorable conditions. The grace and amortization period are as follows;

Actions	Grace	Amortization	Percentage Amortized
Reforestation	5 years	8 years	80%
Forest Management	8 years	15 years	50%
Recovery of Degraded Pastures	8 years	15 years	50%
Agroforest System	5 years	10 years	50%

They shall be financed up to 90% of the required investment.

The required investments for the implementation of this Subprogram are as follows;

Actions	Required Capital (R\$)
Reforestation;	10.000.000
Forest Management;	5.000.000
Recovery of Degraded Pastures	10.000.000
Agroforest systems;	5.000.000
Total	30.000.000

3.2 Control of Burning Activities

(1) Contents of the Project

This subprogram aims at the control of burning activities which is one of the most serious environmental problems in Tocantins State. The following activities shall be developed within this plan:

1. Incentive to the Burning Control Activities
2. Incentive to Extractive Activities.

The burning control activities are considered any activity which may contribute for the reduction of burning causes. The extractive activities shall also be financed to reduce burning activities.

(2) Objective

This Subprogram aims at financing the burning control activities, in order to reduce the causes of uncontrolled burning.

1) Incentive to the Burning Control Activities

This action has the objective to supply a credit lined to burning prevention activities in order to reduce the causes of uncontrolled burning.

2) Incentive to the Extractive Activities

This action aims at stimulating the productive activities which may improve the life conditions of natural extraction producers, allowing them to continue working and producing in their own community. The introduction of an Agroforest system in the extractive activities areas is also anticipated.

(3) Justification, Background, Necessity of the Project

The burning control methods vary according to regional characteristics. These methods shall be developed for each region with the participation of local population.

1) Incentive to the Burning Control Activities

Generally, the uncontrolled burning activities are caused by simple reasons. The use of burning is a constant in the State, mainly during the period from June to October. The objectives are; clearing of pastures by burning the fibrous grass of low palatability or also fanatics who like to see fires.

The small farmer knows by experience that through the "slash and burn" cultivation system in which the field is deforested and soon after burned, a good harvest is obtained with the reduction of diseases and need of weeding. However, he also knows that new areas shall be periodically open for planting, weakening the soil, and finally he has to abandon the area.

There are many alternatives which may be used to avoid this exploitation system. This credit line have the objective to find out alternatives to control burning activities aiming at the reduction of negative environmental impacts.

2) Incentive to the Extractive Activity

In Tocantins, extractive activities such as babaçú extraction and apiculture are important activities developed in certain regions of the state. However, they are considered as low return activities in spite of the contribution for the social and environmental preservation. It is very important to preserve these activities in economic and social terms because of the following reasons;

1. The extractive activities preserve the forest resources and also are considered as income resources; and
2. These activities play an important role in the control of burning and deforestation.

(4) Details of the Project

1) Incentive to the Burning Control Activities

The following items shall be financed in order to reduce burning activities;

1. Supply of agriculture machinery for implementation of barriers against burning;
2. Supply of machinery for prevention of fires;
3. Supply of machinery for soil works and improvement of pastures; and
4. Implementation cost of artificial burning barriers.

The financial conditions are as follows;

To have the "Controlled Burning" authorization issued by IBAMA in the last year and agree to obey the "Control of Burning" for the following 5 years (during the amortization period)

Financing is estimated for an area of approximately 10,000 ha, as the first stage, requiring an investment of about R\$ 5,000,000 (with an installation cost estimated in R\$ 500/ha)

2) Incentive to Extractive Activities

This action supports the vegetal extractive activity as a mean for conservation of natural forests by supplying a credit line for the producers. This credit line shall be supplied to individual farmers, associations or cooperatives and shall be financed as follows;

1. Supply of equipment necessary to promote the extractive activities (babaçú, apiculture, etc.)
2. Constructions of facilities to carry out the activity.

The conditions to become a beneficiary are;

1. To be member of some Association or Cooperative formed by mini and small farmers engaged in the extractive activity;
2. To live in the locality where the investment shall be implemented;
3. To depend on this activity for the subsistence of the family; and
4. To use family man power.

Financing is estimated for an area of approximately 1,000 ha, as the first stage, requiring an investment of about R\$ 5,000,000 (average implantation cost estimated in R\$ 5,000/ha)

(5) Implementation Method

This action shall be implemented through the credit system for farmers, with favorable conditions for producers. The grace and amortization period are the following;

Actions	Grace Period	Amortization	Total
Control of Burning	3 years	7 years	10 years
Extractive Activity	2 years	3 years	5 years

Ninety percent (90%) of the required investment shall be financed

The investments required for the implementation of this subprogram are;

Actions	Required Investment (R\$)
Control of Burning	5,000,000
Extractive Activity	5,000,000
Total	10,000,000

3.3. Environmental Education

The Tocantins State although with less than a decade of existence is already experimenting the environmental degradation problems. In this short time, with a fast progress going on, the disordered occupation and utilization of areas are causing problems, sometimes non-reparable ones. The social problem normally is the link or precursor of many others, which environmentally distress the State.

The man, perplexed in troubled situations, cut his link with nature, neglecting this huge patrimony, leaving it to the predators or he himself assuming this role. As a consequence, we observe the weakening of soil and the presence of pollutants in it, in the water and in the air. In order to solve this problem, we are worried mainly about the educational field, once all the changes necessarily go through this channel. In order the State is socially explored, with a controlled extractive activity, adopting agricultural and industrial policies adequate to its rich underground, urgent measures are necessary.

(1) Contents of the Project

The Environmental Education sub-program aims the formation of the population allowing them to carry out an environmentally feasible occupation, propitiating the improvement of their life quality. In this sense, it is necessary to implant the State Environmental Education program which 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; and
3. Creation of an Agroecological Center.

(2) Objectives

1) Main objective

To inform the communities related to the agricultural sector about the necessity of adequate natural resources utilization. The Program aims at showing to Tocantins State community the importance of facing the reality and its problems in a global way and not as an specific part of an isolated reality.

To give guidance to the rural community in order to minimize several problems such as deforestation showing them alternatives of sustainable management, forestry reposition with native and fruit trees, and vegetal extraction activities. To introduce to the community the knowledge about native specimen, animals and vegetables of the State.

To promote environmental related activities, giving lectures in schools and promoting ecological workshops, seminars, meetings to form Environmental Education multiplying agents (teachers and students).

2) Specific Objectives

1. To support sustainable development projects, propitiating an effective integration of the community in the educational process.
2. To support and stimulate the participation of different social groups in the formulation of environmental policies as well as in the conception and spreading of decisions which affect

the environmental, social and cultural quality.

3. To give instruments to the rural community for that they can intervene in the environment without degrading it.
4. To promote a critical consciousness, aiming the construction of a fair society and an ecologically balanced environment.
5. To develop environmental education by the indigenous communities and traditional populations, oriented to the defense of their interests.
6. To create an environment education center in Palmas and regional nucleuses in all the State, aiming at a better integration among environmental education multiplying agents.
7. To produce educational material oriented to the reality of each region.
8. To propitiate to the Environmental Education State Commission the opportunity to participate in regional, national and international forums, workshops and meetings.
9. To carry out seminars destined to decision making agents and communication means professionals.
10. To carry out together to the population sensitization campaigns, specially oriented to the quality of beaches, to the "queimada" (forest burning) problem, tree celebration week and environment celebration week.

The following actions will be implemented;

Environmental Education	<p>To implement the following projects:</p> <ul style="list-style-type: none"> • S.O.S. Queimada Project • Indigenous Environmental Education Project • Tree Celebration Week Project • Tocantins Chelonian Project • Project about Agrochemicals utilization • Project about animal excrements • Project about the utilization of organic garbage in the rural environment
Creation of an Environmental Educational Center	<p>Headquartered in Palmas (Campus of the Tocantins University Foundation), containing a training center, educational laboratories, library, among other necessary facilities to fulfill the qualification courses requirements for the students and teachers of the ordinary education system.</p>
Creation of an Agroecological Experience Center	<p>To show the importance of the environment within the agriculture and livestock activities.</p> <p>To integrate the urban community to the rural community showing the relationship of all activities to the environment.</p>

(3) Justification, Background and Necessity of the Project

The environment is always the support for the human occupation process, which provokes impact and an increasing land degradation, and consequently a considerable lack of life quality for the population. The constructed environment, resulting from this occupational process, requires actions to promote the reversion of the present tendency for the implementation of sustainable development models.

Any transformation proposal shall necessarily go through the educational process,

emphasizing the participation and valorization of human resources.

The popular participation is essential in this process, being the responsibility of all the concerning agents. As first stage, the Tbilisi conference has defined the following principals for Environmental Education.

1. To consider the environment in its overall aspects: natural, ethnological, social, economic, political, cultural, historical, moral, ethical and aesthetic aspects.

The inherent environmental problems of each municipality of Tocantins State shall be revised. The environmental education is an important integration and valorization instrument, which will lead us to attain a higher responsibility, specially as part of the transformation process.

In the State, the Conservation Units do not fulfill their role. Some are unduly utilized as, for instance, the Araguaia National Park, which is utilized as cattle pasture during the dry season. Furthermore, there are many occupants utilizing the land for animal raising and small crops. The indigenous populations are also used to carry out the "queimada" for maize and pineapple cultivation. This is causing the following problems:

1. Burning ("Queimadas") for pasture renovation
2. Lost of biodiversity
3. Soil compression caused by the bovine pad
4. Domestic animals diseases which attacks the wild animals
5. Migration of animals to other habitats
6. Interference in the indigenous culture
7. Increase in the rate of diseases
8. Weakening of the soil

(4) Details of the Project

The Environmental Education is understood as the participation processes, through which the individual and the community build up social values, acquire knowledge, attitudes and competence oriented to the conquest and maintenance of the right to an ecologically balanced environment, as a benefit to the people and essential to a healthy life quality for the population.

1) Environmental Education

(a) Themes

The following projects will be implemented:

S.O.S. Queimadas Project	to orient the farmers as for the utilization of controlled land burning, the legislation in force and inherent penalties, through educational lectures and distribution of informative and educational material in associations
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	and rural syndicates.
Indigenous Environmental Education Project	to show the necessity to preserve the nature, in the limited indigenous geographical space, searching for alternatives which aims at the sustainable development of the Tocantins State indigenous communities.
Tree Celebration Week Project	to explain to the State community the importance of the Tree for their life and for the environment, teaching to plant and to cultivate trees.
Tocantins Chelonian Project	to develop Environmental Education activities orienting the communities to repopulate, preserve and protect the turtles of the Tocantins and Araguaia rivers together with a permanent inspection during the Project execution.

The amount for this Sub-program is estimated as follows:

Item	Budget (R\$)
1. Implementation of Projects (Third Part Services)	700,000
S.O.S. Queimadas	300,000
Indigenous Environmental Education	100,000
Tree Celebration Week	200,000
Tocantins Chelonian	100,000
2. Procurement of Equipment	500,000
3. Annual Expenses (3 years)	300,000
TOTAL	1,500,000

2) Creation of the Environmental Educational Center

It will be created a training center installed with classrooms, laboratories for middle and high schools students, auditorium, library, dormitories, dinning hall, living room. The location will be in Palmas, in an area to be donated by Tocantins University Foundation - UNITINS - where the Palmas University Campus will be constructed.

1. Library
2. Audiovisual Equipment Room
3. Classroom
4. Laboratory
5. Living room
6. Dormitories
7. Dinning hall
8. Kitchen
9. Support room
10. Workshop and laundry room

It will also be equipped with the following equipment;

1. Furniture

2. Audiovisual equipment
3. Computer sets
4. Diffusion equipment
5. Vehicles

The amount for this Sub-program is estimated as follows;

Item	Budget (R\$)
1. Fixed Investment (Installation, etc.)	1,600,000
Construction (1,000 m ²)	500,000
Furniture	200,000
Audiovisual Equipment	300,000
Computer Sets	200,000
Diffusion equipment	200,000
Diffusion units	200,000
2. Annual Expenses (3 years)	300,000
	1,900,000

3) Center for Agroecological Experience

To diffuse greenery and medicinal herbs production techniques in small urban spaces through courses on seedlings, vegetable garden, trees and orchards production.

Seedlings will also be produced and distributed to the population interested in keeping vegetable gardens (schools, communities and houses).

For this purpose, the following facilities are going to be built:

1. Administrative Center (Building: 200 m²)
2. Diffusion Center (Building: 300 m²)
3. Cultivation Area (1 ha)

The following equipment will also be supplied:

1. Furniture for the Administrative Center
2. Furniture for the Diffusion Center
3. Computer sets
4. Diffusion equipment
5. Vehicles

The amount required for this Sub-program is estimated as follows;

Item	Budget (R\$)
1. Fixed Investment (Installation, etc.)	900,000
Construction (500 m ²)	250,000
Furniture	150,000
Audiovisual Equipment	100,000
Computer Sets	200,000
Diffusion equipment	200,000
2. Annual Expenses (3 years)	300,000
	1,200,000

(5) Methodology of Project Implementation

The actions will be divided as follows;

1. Construction of Buildings;
2. Procurement of Equipment and Furniture;
3. Seminar Activities (Third Part Services)

The amount required for this Sub-program is as follows;

	Environmental Education	Educational Center	Agroecological Center	Total
Construction of Buildings	-	500,000	250,000	750,000
Procurement of Equipment	500,000	1,100,000	650,000	2,250,000
Third Part Services Publications	700,000			700,000
Amount Expenses (3 years)	300,000	300,000	300,000	900,000
Total	1,500,000	1,200,000	1,200,000	4,400,000

This actions shall be carried out through public bidding.

3.4 Environmental Monitoring System

(1) Contents of the Sub-Program

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

1. Monitoring for Burning Activities
2. Construction of Laboratory Center (UNITINS)
3. Installation of Agro-meteorological Observation System
4. Monitoring of Agriculture, Livestock ad Industries Activities
5. Installation and Maintenance of the NATURATINS Regional Center
6. Studies for the creation and vitalization of Conservation

Activities for each component are as follows;

Components	Activities
Burning Control	<ul style="list-style-type: none">• Implementation of researches about burning activities• Implementation of the Burning Control Seminars• Publication of Studies Results• Equipment for Laboratories• Equipment for Researches
Construction of Central Laboratory	<ul style="list-style-type: none">• Construction of Environment Monitoring Laboratory• To equip a Movable Units (laboratories)• Publication of Information Materials• Implementation of Seminars and Sensitization Campaigns
Agro-meteorological Observation Network	<ul style="list-style-type: none">• Construction of Agro-meteorological Observation Network• Construction and Feeding of a Data Bank Center• Equipment for the Meteorology and Water Resources Nucleus

Installation and Maintenance of the NATURATINS Regional Center	<ul style="list-style-type: none"> • Monitoring and Control of the Forest Activities • Monitoring of Land Use and Water Resources • Implementation of the Integrated Environmental Control System • Maintenance of the NATURATINS Laboratory • Monitoring of Environmental License
Installation and Maintenance of the Regional Offices	<ul style="list-style-type: none"> • Construction and Equipment Installation for Regional Offices • Maintenance of the Regional Environmental Control Offices
Studies for the Creation and Vitalization of Conservation Units	<ul style="list-style-type: none"> • Survey and Evaluation of Areas Adequate to become a Conservation Units • Structuring of Conservation Units to be created • Survey on current operational problems of the existing CUs

(2) Objectives

General objectives of this Sub-Program are to prevent the disordered development of agriculture, establishing a Monitoring system in order to assure environment quality. The State Environmental Monitoring System will be improved and maintained. The objectives of this action are as follows;

1) Monitoring of Burning Activities

To reduce the burning activities number and area in Tocantins State through the orientation of technological alternatives and some financial subsidies for small farmers so that they can avoid the utilization of burning. Moreover, in the course of the implementation of this action the following objectives will be attained;

1. To improve the sensory and mapping methods for the identification of burning foci
2. To inform environmental regulations about burning activities for the communities
3. To promote the participation of the small farmers in the environmental conservation actions
4. To introduce alternative technologies for the adequate land use, controlling the burning activities
5. To inform the importance of natural resources preservation and rationalized land use method

2) Construction of Central Laboratory (UNITINS)

Objectives of this action are as follows;

1. To develop monitoring methods of land use and water resources mainly related to agricultural activities.
2. To promote integrated inspection and monitoring system of natural resources, mainly water and soil, through the establishment of Basin Committees and Water Agencies.
3. To promote integrated inspection of agricultural lands, aiming at the control of burning activities.
4. Specific objectives of this component are as follows;
5. To construct the Environmental Monitoring Laboratory at the State Central Region

for periodic analysis of water, soil, sediments and residues.

6. To equip movable units for material collection and quick analysis.
7. To equip the Meteorological Nucleus and the Environmental Monitoring Center aiming at the monitoring of the climate and burning activities.
8. To promote and stimulate the research over soils and water resources aiming at the establishment of environmental indicators for monitoring purposes.
9. To produce informative materials for entrepreneurs and small farmers about the environmental control in the agricultural activity.
10. To promote seminars and sensitization campaigns for the orientation of rural producers.
11. To propitiate the participation of researchers in Forums, Congresses and Seminars.
12. To create a data bank.

3) Installation of the Agro-meteorological Observation Network

Objectives of this component are to collect necessary data for agricultural research. Agro-meteorological observation networks will be established for this purpose. The data collected in these networks will be available for the public, through the Opened Data Bank System.

1. To collect agronomic and meteorological data
2. To construct the observation networks
3. To systematize the data, utilizing a data bank system
4. To study the effects of the burning activities in the State
5. To study the interrelation between climate and production
6. To divulge the Research results

4) Monitoring for Agriculture, Livestock and Industrial Activities

Objectives of this component are as follows;

1. To regulate the Environmental license for the Agriculture, Livestock and Industry activities
2. To control and monitor the Forest Areas
3. To monitor water resources utilization
4. To monitor land use
5. To effectuate the Economic - Ecological Zoning Regulation
6. To implement Integrated Environmental Control System

5) Installation of NATURATINS Regional Office

Objectives of this component are as follows;

1. To promote NATURATINS activities decentralization for all the State
2. To install NATURATINS regional offices in all regions of the State
3. To build and equip the regional offices
4. To maintain the inspection, control and monitoring activities of the regional offices
5. To diffuse the environmental issue to all regions of the State

6) Studies for the Creation and Utilization of Conservation Units

Objectives of the components are as follows;

1. To improve the studies carried out in areas previously indicated for the creation of Conservation Units;
2. To discuss together with the concerned community about the feasibility of CU creation, the type and more adequate management systems.
3. To create the necessary infrastructure for the implementation of Cus
4. To propose mechanisms to revitalize and improve the existing Cus

(3) Justification, Background, Necessity of the Project

Main economic activities of the Tocantins State are agriculture and livestock. The State is going through an structuring process of the basis which assure the agriculture and livestock production as well as its commercialization and technological evolution. Despite the importance of the environmental factor, the environmental monitoring and control in the agriculture sector are frequently inefficient, due to the large territorial extension of the State as well as to the inadequate fulfillment of demands in the environmental field.

As a first strategic action to improve the environmental monitoring system, institutional strengthening is necessary in order to attain immediate results, specially at local level, as well as the improvement of a data collection system and control of irregular actions, all involving the participation of the communities.

1) Monitoring of Burning Activities

In the last two decades, in the Amazon forest region, particularly in Tocantins State, devastation of forest caused by burning activities and deforestation are drastically increasing, resulting in increasing air pollution, soil erosion, deterioration of natural resources, and worsening of social, economic and cultural problems. This issue is concerning governmental, scientific, technical, political, entrepreneurial and community institutions, with national and international repercussion.

Improvement of the data collection and information system, through the monitoring system, is a basic methodology to prevent the cause of the pollution and to take appropriate political measures, where there is scarcity of related data.

Another point of the problem is the rural communities lack of knowledge about the environmental legislation, specially the burning control legislation at the Amazon region. Despite the existence of a burning control legislation, the implementation of controlled burning is very difficult due to the fact that the practice of burning is very common as a traditional cultivation method.

Therefore, it is recommended to carry out a campaign through the conventional communication means about the issue in order to involve the community leaders, those who are qualified to interpret the legislation and give guidance to the rural producers. The guidance process to the farmers requires the supply of feasible alternatives and technologies, from the operational and financial points of view, in order to induce them to replace historical and inadequate land use practices by others with less impact over the environment. It is necessary to offer options and subsidies to avoid the burning practices.

2) Construction of a Central Laboratory (UNITINS)

The introduction of modern agricultural practices which objective is mainly the increase in productivity is the main responsible for agro-environmental changes, specially in the water-soil-plant divisions. These phenomena can be observed at large scale farms which adopt high inputs utilization practices. In these farms, the inadequate application of agricultural inputs such as pesticide, herbicide, insecticide is common, without due consideration to the recommended dosage and to the physical-chemical characteristics of the products, as well as to soil characteristics such as texture, structure, depth and water infiltration rate.

The consume of agrochemicals in Brazil is significantly increasing for the five main crops: potato, sugar cane, soybean, orange and tomato. According to the IBGE data, the volume of agrochemicals utilized only for orange crops amounted to 11 thousand ton. The total volume applied to all mentioned crops, as of 1990, surpassed sixty thousand ton. In the Tocantins State, the use of agrochemicals is increasing, following the expansion of the agricultural frontier.

However, at present, there is no laboratory equipped for environmental analysis in Tocantins State, thus water and soil analysis activities are depending on other states laboratories. Considering the future expansion of the agricultural activities in Tocantins, sufficient facilities for the above mentioned analysis is an essential item for the development of the State and for the control of the environment quality.

3) Installation of Agro-meteorological Observation Network

In Tocantins State, besides the inexistence of a proper climatological observation network, the geographical situation of the State which covers a total of 8° of longitude, transition strip between the tropical and humid tropical climates, are important reasons for the installation of a meteorological observation network in order to secure basic information about the climate. Through the installation of the observation network, the State can develop agricultural research aiming at finding adequate technologies for sustainable agriculture.

Considering the geographical conditions and the existence of observation sites, the installation of 15 stations will be required.

4) Monitoring of the Agriculture, Livestock and Industrial Activities

In the execution of a project, the application for the environmental license is a basic procedure for the start. In order to attain effective control of the environmental monitoring, strengthening of supervising process is necessary.

5) Installation NATURATINS Regional Offices

This action has the objective of strengthening the local offices activities in order to execute the effective control of irregular actions, such as unlicensed burning, deforestation without planning, etc.

6) Studies for the Creation and Vitalization of Conservation Units

The Conservation Units are very important as mechanisms to assure the preservation of biodiversity. However, there are several management models for the CU, and their definition depends on natural conditions, anthropization level, fragility of natural landscape and social aspects of the region. The perfect inter-relation of all these factors is fundamental for the effective implementation of CUs. In this sense, the Tocantins State is in need of areas destined to become CUs. The existing ones are lacking resources and planning of actions is deficient, without management plans and community participation.

(4) Details of the Project

1) Monitoring of Burning Activities

The following actions will be implemented;

1. Prevention and Control of Deforestation and Burning Activities.
2. Environmental Education about the use of Burning.
3. Supervising of Deforestation and Burning Activities.
4. Prevention of Burning Activities.

(a) Contents of the Actions

- **Prevention and Control of Deforestation and Burning Activities (1995/1996)**

To reduce the deforestation and burning activities rate in the Legal Amazon Region in order to allow the implementation of the Integrated National Policy for the Legal Amazon.

- **Environmental Education about the use of burning - S.O.S. Queimadas Project**

To attain the correct utilization of burning through awareness of rural producers. To give guidance to communities through informative materials as for the before mentioned issue.

- **Supervising of Deforestation and Burning Activities.**

To reduce the deforestation and burning activities rate in the affected regions, applying the environmental legislation in force, propitiating a joint work between the civil society and government in the control of irregular and indiscriminate deforestation and burning activities.

- **Prevention of Burning - PREVFOGO**

To decrease the use of burning by farmers, through the supervising of these activities during the dry season.

- **Monitoring and Mapping regarding to burning foci in the State**

In the implementation of the Conservation Program, the participation of the community in terms of a sustainable development is a basic condition in order to obtain the success of the said Program.

(b) Location and Dimension of the Project

The Project shall cover the major part of the State. Special attention shall be paid in regions where subsistence agriculture predominates. Priority areas for this action are: Colinas do Tocantins, Gurupí, Dianópolis, Araguaína, Lagoa da Confusão, Palmas, Jalapão and Bico do Papagaio.

2) Construction of the Central Laboratory (UNITINS)

In the construction of the Central Laboratory, the provision of the following items is required;

1. Construction of the Facilities
2. Equipment for Movable Units (03 units)
3. Technician Training Courses
4. Monthly Water and Soil Sampling for Analysis
5. Preparation of Monthly Reports
6. Annual Seminars

3) Installation of Meteorological Observation Network

The proposed 15 sites for the installation of meteorological observation networks are; Gurupí, Araguaçu, Formoso do Araguaia, Palmas, Aparecida do Rio Negro, Caseara, Pedro Afonso, Ponte Alta do Tocantins, Lizarda, Goiatins, Araguaína, Arapoema, Ananas, Tocantinópolis and São Sebastião do Tocantins.

The distribution of the above mentioned stations will allow the collection of information

in several regions of the State, propitiating the comparison of different points data and thus the obtainment of subsidies for planning in different fields.

4) Monitoring of Agriculture, Livestock and Industrial Activities

The following actions will be carried out;

- Environmental licensing for new projects.
- Forest control with the issue of deforestation licenses and forest management plans.
- Monitoring of water resources and land use.

5) Structuring of NATURATINS Regional Offices

The following actions will be carried out;

- Installation of Supporting Base for 7 local offices.
- Installation of a Communication System for the State.
- Training of Staff.

(5) Implementation Method

1) Monitoring of Burning Activities

(a) Work Schedule

This action will be implemented in two Phases:

Phase I - Planning:

1. Field Survey programming.
2. To schedule the Burning Activities Prevention and Control Project in each Municipality.
3. Preparation and Evaluation Meetings.
4. Preparation of Educational Material to be presented in the Burning Activities Prevention and Control Project.

Phase II - Execution:

1. Implementation of Preventive Actions for the orientation of farmers about the legislation in force and inherent penalties.
2. Local Meetings.
3. Dissemination of Information at local level.
4. Distribution of educational material.

These activities will be carried out in a contract basis.

The products of these activities shall have the following specifications;

1. Maps with the record of burning foci (number and class), statistical analysis and pertinent considerations;

2. Periodicity: weekly and monthly, including the dry period;
3. Covering Area is around 2,500 km² (30' x 30').

I - PRIORITY REGIONS	II - STRARATEGICAL MUNICIPALITIES
<p>a) Bico do Papagaio:</p> <ul style="list-style-type: none"> - Esperantina - Carrasco Bonito - Augustinópolis - Araguatins - Tocantinópolis - Ananás <p>b) Araguaína:</p> <ul style="list-style-type: none"> - Babaçulândia - Filadélfia - Araganã - Aragominas - Wanderlândia <p>c) Colinas do Tocantins</p> <ul style="list-style-type: none"> - Arapoema - Guaraí - Bernardo Sayão - Pedro Afonso - Juarina - Itacajá - Colméia 	<ul style="list-style-type: none"> - Dianópolis and neighboring municipalities (Southeast Region) - Gurupi (South Region) - Palmas (Central Region) - Ponte Alta do Tocantins (Jalapão) - Lagoa da Confusão (Bananal Island)

(c) Execution Period

During the dry period (May to August of each year).

(d) Program Schedule

	<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>Sept</i>	<i>Oct</i>
Information by Radio and TV						
Preparation of Educational Material						
Distribution of Educational Material						
Diffusion at Rural Communities						
Evaluation Meetings						
Establishment of the Program						
Contract for Third Party Services						

(e) Cost

The following equipment will be required;

1. Furniture
2. Computer Sets
3. Laboratory Equipment
4. Audiovisual Equipment

5. Vehicles

Estimated cost is as follows;

Item	Cost (R\$)
I. Fixed Investment (Installation, others)	
Furniture	200,000
Computer sets	300,000
Laboratory Equipment	500,000
Audiovisual Equipment	200,000
Vehicles	100,000
I. Running Cost (3 years)	1,000,000
Total	2,300,000

2) **Construction of Central Laboratory (UNITINS)**

The following provisions will be required;

1. Furniture
2. Computer sets
3. Laboratory Equipment
4. Audiovisual Equipment

Estimated cost for the implementation of this action is as follows;

Item	Cost (R\$)
I. Fixed Investment (Installation, others.)	
Equipment	300,000
Furniture	200,000
Computer sets	500,000
Laboratory Equipment	200,000
Audiovisual Equipment	600,000
I. Running Cost (3 years)	600,000
Total	2,400,000

3) **Installation of Meteorological Observation Network**

In this action, 15 stations will be installed with following equipment;

1. Office Equipment
2. Computer Sets for Data Bank
3. Equipment for Agrometeorological Stations

Estimated cost for the implementation of 15 stations are as follows;

Item	Cost (R\$)
I. Fixed Investment (Installation, others)	1,600,000
Construction of 15 stations	200,000
Office Equipment	200,000
Computer Sets	400,000

Agrometeorological Stations Equipment	800,000
1. Running Cost (3 years)	800,000
Total	2,400,000

4) Monitoring of Agriculture, Livestock and Industrial Activities

The following activities will be required;

1. Environmental Licensing

- (a) Running Cost
- (b) Improvement of Monitoring System
- (c) Improvement of Services rendered to the Public

2. Forest Control

- (a) Running cost
- (b) Geoprocessing Survey for Deforestation follow up
- (c) Information System for decentralized Forest Control
- (d) Incentive to Management Plans and Private Natural Reserves

3. Monitoring for Water Resources

- (a) Mapping of the Hydrographical Network
- (b) Selection of Sampling and Classification Points
- (c) Maintenance of NATURATINS Laboratory
- (d) Monitoring of classified Basins
- (e) Record of the main Erosion Areas
- (f) Support to rural extension services in the soil conservation programs

4. Improvement of Environmental Agencies Infrastructure

- (a) Construction of Conference Room, Library and COEMA Facilities
- (b) Construction of CIPAMA Facilities
- (c) Installation of Geoprocessing and Remote Sensing Laboratory
- (d) Vehicles
- (e) Complement the equipment and devices of the Environmental Laboratory
- (f) Establishment of a Rehabilitation Center for Wild Animals (CIPAMA)

Estimated cost for this action is as follows;

Item	Cost (R\$)
I. Fixed Investment (Installation, etc.)	2,400,000.00
Construction	800,000.00
Furniture	400,000.00
Vehicles	600,000.00

Computer Sets	300,000.00
Laboratory Equipment	300,000.00
1. Running Cost (3 years)	900,000.00
Total	3,300,000.00

5. Installation of NATURATINS Regional Offices

The following actions will be carried out;

1. Following provisions will be required;

- (a) Construction of 7 regional offices
- (b) Construction of Control post for Environmental Police
- (c) Equipment for offices
- (d) Furniture for regional offices
- (e) Vehicles
- (f) Running cost

2. Installation of Communication System

- (a) Provision of Communication Equipment
- (b) Divulcation of the "Green Line" for all the State
- (c) Equipment of vehicles with radio communication system

3. Training

- (a) Training (Specific Activities)
- (b) Others

Estimated cost is as follows;

Item	Cost (R\$)
1. Fixed Investment (Installation, etc.)	1,700,000.00
Construction	800,000.00
Furniture	200,000.00
Vehicles	500,000.00
Computer Sets	100,000.00
Audiovisual Equipment	100,000.00
2. Running Cost (3 years)	700,000.00
Total	2,400,000.00

(6) Studies for the Creation and Vitalization of Conservation Units

Implementation of the Action will be carried as follows;

1. Construction of Facilities;
2. Provision of Equipment and Furniture;
3. Seminar (third part services)

Estimated cost for this sub-program is as follows;

	Monitoring for Burning Activities	Central Laboratory	Agrometeorologic Network	Monitoring for Industrial Activities and others	Installation of NATURATINS Regional Offices	Total
Construction of Facilities		300,000	200,000	800,000	800,000	2,100,000
Equipment	1,300,000	1,500,000	1,400,000	1,600,000	900,000	6,700,000
Subcontract						
Publishing						
Running Cost (3 years)	1,000,000	600,000	800,000	900,000	700,000	4,000,000
Total	2,300,000	2,400,000	2,400,000	3,300,000	2,400,000	12,800,000