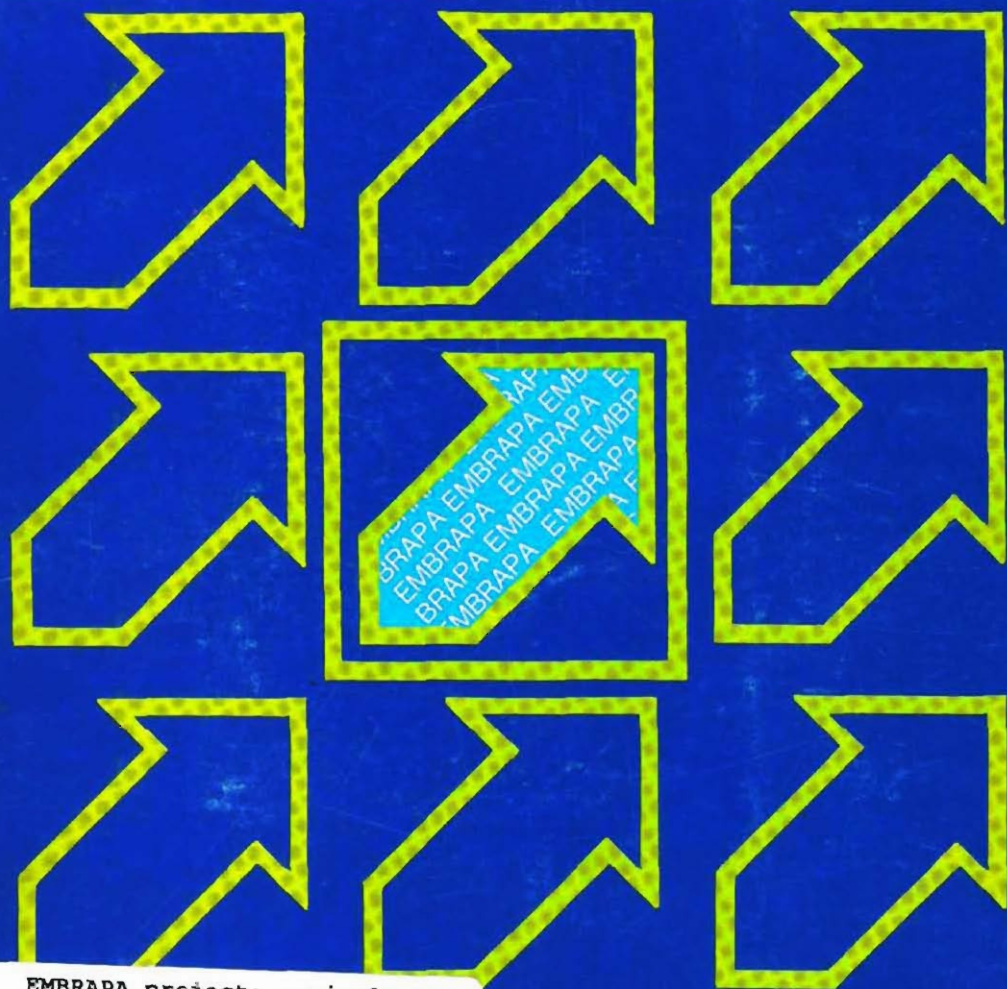


EMBRAPA Project

Agricultural Research Going
into the XXI Century



EMBRAPA project: agricultural

1991

FL - 00359



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XAVIER FLORES

EMBRAPA Project

Agricultural
Research
Going into
the XXI
Century

Murilo Xavier Flores
President of EMBRAPA

Brasília, April 1991

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EMBRAPA-SEA. Documents, 4

Original Title: Projeto EMBRAPA:
A pesquisa agropecuária rumo
ao século XXI.

Cover: Izabel Persijn

FLORES, M.X. **EMBRAPA project: agricultural re-
search going into the XXI century.** Brasília:
EMBRAPA-SEA, 1991. 40p. (EMBRAPA-SEA.
Documents, 4).

1. EMBRAPA-Research, 2. EMBRAPA-Adminis-
tration; 3. Agricultural Policy, I. EMBRAPA-SEA, II.
Title, III, Series.

CDD.350.00072



PRESENTATION

The Document "EMBRAPA PROJECT: Agricultural Research Going into the XXI Century" outlines and marks the paths of the EMBRAPA we are building.

EMBRAPA PROJECT develops and advances the ideas and goals that built our proposal for EMBRAPA since the first day of our administration. The proposal incorporated concerns and demands that already existed within the company, trying to harmonize them with ecological, technological, social, economic, political and institutional transformations taking place on the national and international scene.

In the administrative sphere, our proposal identified excessive centralization of activities at the headquarters, which hurt the agility, flexibility, autonomy and technical-scientific production of the research units around the country. A lack of financial resources for the generation and diffusion of technology was also identified, along with a reduction of employee productivity.

On the technical-scientific level, the proposal pinpointed the following necessities:

- 1. to implement the shift in agricultural research;*
- 2. to revise concepts upon which was based technology's research and transfer, and;*
- 3. to follow recent scientific advances, new challenges to agribusiness and the current demands of society was also noted.*

On the political level, our proposal called attention to the gap between the company research policies and the Federal and State agricultural policies, to the EMBRAPA's coordinating function within the Cooperative System for Agricultural Research, and to the relationship among the company and a large part of organized segments of society.

However, we also understand that these problems reflect a general situation which transcends the institucional boundaries of the company. EMBRAPA performance for the political and economic context of the 1970's and early 1980's was excelent. Today, the context is completely different, and changes taking place in the world and in Brazil have made the institutional model of most organizations obsolete. That is why our proposal called for changes which include the conceptional, organizational, administrative and political levels of the company.

Historically, the reaction of organizations faced with moments of profound change, like the current one, divides them into three types of institutions: (1) those which do not even realize there are changes occurring around them and which are therefore condemned to disappear; (2) those which perceive the changes but are unable to incorporate them and which therefore will be "changed"; and (3) those which are capable of anticipating change and will therefore be the protagonist in their own process of transformation. We are reorganizing EMBRAPA in the molds of the third group.

Some actions have already been taken to set off, support and orientate the process of

modernizing EMBRAPA. The actions currently in course include: (1) measures for administrative decentralization; (2) an overall diagnosis of EMBRAPA which, by evaluating projects, researchers, programs, research units and the company as a whole, will show the reality which we found; (3) a process which, by using strategic planning concepts and techniques, will redefine the EMBRAPA mission and objectives, showing the new reality we should work toward; and (4) formulation of policies, directives and global strategies to support and orient the company along the path between the current and future realities.

Furthermore, we have taken an unprecedented initiative by promoting a change in the "organizational ecology" of the company in the Amazon: i.e., making the institutional and human resources available adequate to the agricultural ecological, social and economic context of the region.

However, the time has come for this administration to add depth to the project, by having all the company's employees and other segments of society participate, in order to assure greater coherence and consistency in its proposals. This is a document open to constructive debate on the design and new institutional paradigm for agricultural research.

We want EMBRAPA decentralized – so that it will be more agile in its activities; more regional in its research – so its research will be more adequate to the characteristics and challenges of each region; more flexible – to be able to incorporate external changes faster; better prepared to increase the technological

*competitive character of national agriculture and agribusiness; more concentrated on areas of advanced technology; more modern – to accompany the technical, scientific and administrative progress taking place all over the world; more permeable to the current and future desires of society and more pledged socially and politically with the necessity of wiping out the regional and social inequalities of the country.
THAT IS WHAT WE WANT.*

*Murilo Xavier Flores
President of EMBRAPA*

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INTRODUCTION

Beginning in the 1980's, the crisis in the international development model became evident, putting both the standard of economic competition via pricing and the technological standard of "productivity" - which only was aimed at increasing productive capacity - in check. Within those standards, the different segments of society were only a point of reference to support the movement and rhythm of the technical base of production. The economic development model adopted by Brazil, which had import substitution as a political priority, incorporated those technological and economic standards.

The 1990's mark a new standard for economic competition, which puts more weight on competition via quality and diversification of the products, and a new technological standard, which adds the qualitative concept to productivity, which was formerly reduced to its quantitative dimension. Here, the different segments of society can and should become protagonists in the process of defining the policies which affect their every-day life. In its proposal for a Program for Agro-Industrial Competition (PCA), the Federal Administration explains and incorporates those new concepts of technological standards and economic competition.



As a result of the economic development model which prevailed in Brazil during recent decades, the advances attained by agriculture and agro-industry were guided by an uncontrolled demand for immediate results, which produced contradictions unacceptable to society.

Examples of those contradictions follow: creation of "technological packages" which conflicted with the concept of self-sustainable development; irrational use of natural resources and harm to the environment; privileges given exporting segments in detriment to those dedicated to producing basic food stuffs; increased concentration of landholdings in the hands of a few; upsetting the rural job market; an industrial policy which intensified the migratory flux from the farm to the city, but which was incapable of providing the necessary training to absorb laborers coming from rural sectors; low wages in rural operations. All that made regional and social inequalities even worse.

Therefore, the crisis of Brazilian public institutions can be understood as a direct consequence of the national development model under which they were created.

Today the old problems and new challenges are related to a totally different context, which demands a redefinition of the roles of governmental, non-governmental and private institutions. That "redefinition" of missions is a prerequisite for the institutional standards



which will take the country into the next century in condition to compete and offer a better quality of life.

Evidence on the national and international scene points to the breakdown of the institutional model which supported Brazilian economic development in recent decades. The new development model to be drawn up during the 1990's will demand a new institutional arrangement and posture of EMBRAPA, as well as of the other public institutions of the country. It is in that context that we are trying to capture, on both the international and national scenarios, the fundamental elements that will build the new standards of economic development.

Some elements have already emerged as important to the new development model. A few of them are: the requisite of "self-sustainability"; greater participation of different segments of society in defining and checking on economic and social policies and priorities; the central importance of science and technology to produce the new technical base for the qualitative leap forward in the development models; greater articulation among sectors and institutions; incorporation of concepts modeled by the systemic approach, such as "agricultural ecology", "ecosystem", "complexes" and "chains"; emphasis on formulation of regional production systems; priority for areas of advanced technology; decentralized administration; adoption of collegiate and participative



management, and greater participation of the private sector in productive activity.

Despite the initiatives EMBRAPA has taken to modernize in the 1990's and to prepare for after the year 2000, it must advance further. However, advancing will require a gigantic effort on the part of everyone who makes up the institution. It is the need for that joint effort that justifies this document. We hope it will kindle a constructive debate so we can all amply understand the current historical moment, the need for intelligent changes that are coherent with the new national and international reality and the need for us to define and implement those changes. THAT IS ALL WE WANT.

THE ROLE OF EMBRAPA



The institutional mission of EMBRAPA is to generate and promote the scientific and technological production which will make possible self-sustained development of national agriculture and agro-industry, aimed at the social and economic well-being of Brazilian society through the rational use of natural resources and conservation of the environment.

EMBRAPA has two fundamental duties in supporting the Federal, State and Municipal Governments: to offer the technical base for transforming the productive structure and to contribute to overcoming regional and social inequalities.

The traditional technological standard which put emphasis only on



quantity within the concept of productivity is incompatible with the new standard of economic competition via quality and diversity of products. This new pattern of competition will help those agricultural, forestry and agro-industrial products that are characterized by intense use of scientific and technological knowledge. The former technological standard, however, does not give economic agents a technical base of production which allows them to adapt to the new form of competition. EMBRAPA should assume leadership in the process of formulating a new technical base which will let the economic agents make the productive structure of agriculture and agro-industry more competitive.

On the other hand, for EMBRAPA, the structural heterogeneity of Brazilian geography should justify a differentiated organization of its institutional and human resources in order to contribute to the Administration carrying out the very necessary task of reducing regional and social disparities.

REORGANIZATION OF EMBRAPA



At the moment, reorganizing any public Brazilian institution demands a complete revision of its most strategic institutional variables. In that sense, EMBRAPA should revise especially its conceptual, organizational, administrative, cultural and political dimensions. Furthermore, the company should also examine the question of human resources, the managerial question and the



mechanisms for relating to other sectors and institutions.

Conceptual Dimension

It is fundamentally important that the company reformulate a conceptual standard and define the nature and directions of its research projects and programs.

In the exercise of conceiving his projects, the researcher should understand that research does not necessarily begin and end with the product. In that vision, EMBRAPA only produces technology for those who produce. However, EMBRAPA also produces technical and scientific information which can result either in technology that can be used by those who produce, process, transport, store, commercialize and consume, or in articulate information which can contribute to the work of those who teach, research, disseminate, plan, invest, finance and revise or formulate scientific and technological policies for agriculture, destined to agriculture and agro-industry and to the activities of rural development.

The concept of agriculture is wider in scope and implies in sectorial interfaces that demand an approach in which "research begins and ends in society", since different social sectors have different demands to be met by different sets of technical and scientific information generated by EMBRAPA and offered in different forms.

That activity of conceiving research projects should be supported by orientation on a set of basic concepts that will influence the profile of new international and national models of development. Examples of these concepts are: self-sustained development, agricultural ecology, ecosystem, interdisciplinarity, food security, social justice and biological diversity (biological capital).

In turn, the conceptual design of research programs demands creativity to select the criteria destined to define its form and content. The traditional way of distributing researchers and projects by technical areas, disciplines and/or specialities induces a reductionist approach in the analytical design for the solutions. Results obtained in the project for overall evaluation of EMBRAPA reveal that the mono disciplinarity within and among researchers has reduced the company's scientific and technological production. Here, interdisciplinarity emerges as a factor of promoting the kinetic energy of technical and scientific production.

To better represent the complexity of the geographical space, the programs should be defined, for example, around criteria that would reflect ecosystems, large agricultural- ecological and social-economic problems, great environmental and/or social-economic challenges or themes and problems of strategic interest in one state or region or in the whole nation. Only then should the technical

areas and specialists be asked what contribution they would have to confront those problems which challenge the success of the research programs.

Programs thus defined would bring back and/or strengthen the connection between the activities of research and the activities of development. Furthermore, programs conceived within that perspective would also demand formulation of interdisciplinary and inter-institutional projects. The results of the global evaluation of EMBRAPA offer evidence that an intense exchange of information between the institutes which generate technical-scientific information and their users is the factor which explains the scientific production of the best researchers.

On the other hand, incorporating concepts like "complexes" (as in the case of the agro-industrial complex) and "chains" (as in the case of the food chain), in projects and programs would be extremely useful for helping researchers understand the interfaces of their specialities, of their projects and of the agricultural sector with other sectors of the economy.

Finally, while the Administration is currently defining a greater space of action of private enterprise in the productive sector, the relation between EMBRAPA and private enterprise is still incipient. However, data obtained in the global EMBRAPA evaluation project shows that where the research-private enterprise relationship does exist, there is



an increase in the researchers technical-scientific productivity. Thus, discussion on the concept of participation of private enterprise in the research activity should be renewed. Within this new perspective, it should, however, be assured that there be space for the company to continue to fulfill its social duty in applying public funds in research, which includes the demands of segments of society which have less capital and less political power to defend their interests.

**Organizational
Dimension**

EMBRAPA needs to realign its "organizational ecology", which now defines the institutional design and geographical distribution of its research units, with their respective human, material, financial and technical resources. The continental dimension and geographical heterogeneity of Brazil make the existence of a single organizational model for EMBRAPA units around the country inviable.

On the other hand, the nature of the activities of the different research units influences the quantitative and qualitative definition of institutional and human resources necessary to carry out its missions. While EMBRAPA already has different categories of research units (like national product centers, resource centers, special services, etc.), there still must be a more precise analysis to define an organizational logic for the institutional arrangement of the Cooperative System for Agricultural Research (SCPA) around more consistent criteria, like "region" or "ecosystem".

On the other hand, the reasons which justify our policy of administrative decentralization are the same which do not allow us to maintain the National Research Programs (PNPs) as a criterion or forum for discussions on allocation of funds for research to be carried out far from these decision centers. Therefore, it became necessary to also decentralize the budget. That redefinition of the role of the PNPs, however, does not take away their importance as aggregating units of research projects. Nevertheless, the "aggregating unit" of projects should be discussed anew until a way is found (or not) to make them more functional. After the question of efficiency has been added to the process of aggregating projects, it will be decided where the "aggregating unit" will be located. It could be in the PNPs, or it could not.

Regarding institutional arrangement for research, a pioneer initiative is being taken by EMBRAPA in the Amazon. All the Units for Carrying Out Research on the State Level (UEPAEs), which exercised the reductionist approach of research by product, were transformed into Agro-Forestry Research Centers (CPAFs), in their respective states. Now they are having to revise their conceptual, organizational and administrative dimensions to adapt themselves better to the agro-ecological and social-economic characteristics and challenges of the region where they are found.

Due to its comparative advantage in research infrastructure and greater

number of qualified researchers, the Research Center already found in the State of Amazonas (CPAA) became a technological, methodological and informational reference point for Western Amazon. The Research Center existing in the State of Pará (CPATU) was merged with the UEPAE in Belém in order to become the technological, methodological and informational reference point for the Eastern Amazon.

To overcome the traditional lack of integration among research units in the region and the resulting fragmentation and wasted efforts, the Regional Amazon Agro-Forestry Research Council (CRPA) was created. The Council is made up of all the heads of EMBRAPA research units in the region. It is a forum for discussing and defining policies, directives, problems and research priorities on the regional level. It establishes the concrete mechanisms for participation by the social segments most interested in defining, following-up and evaluating the research policies and priorities for that region.

While the ecosystem criterion offered the logic for regionalization of the EMBRAPA organizational model in the Amazon, it is possible that the same criterion will not be applicable to make similar initiatives viable in other regions of the country. Therefore, it is necessary to discuss and define the criteria most appropriate to each region, even if at first that conduct should result in an apparent lack of organizational logic. In some cases, we will have to debate the

solutions and even experiment with alternatives.

Nevertheless, no matter what the institutional arrangement on the regional level, the creation and effective functioning of consultative councils for each region and technical-administrative councils for each EMBRAPA Unit will guarantee a high return for the company and for the users of its research. Data from the global evaluation of EMBRAPA point to that type of organization as most adequate. Researchers who work in research units where technical councils already exist and function and where decision making is collegiate are the ones with the highest production.

Administrative Dimension

The logic of the administrative model of EMBRAPA research units still finds its roots in the concepts of structural hierarchy, sectorial divisions and managerial models formulated 17 years ago. Centralization is its principal characteristic. Therefore, the administrative structure of the company overloaded its higher levels of administration while it took power away from the intermediate levels of management.

Now new challenges and the changes taking place in Brazil and the rest of the world demand a total reformulation of the administrative structure and managerial models of institutions to reduce bureaucratic barriers and operational costs while increasing efficiency and efficacy of the managerial activity. Results of the global evaluation of EMBRAPA suggest it is essential to reduce the vertical levels of the



hierarchy and decision making, since excessive verticalization is a factor which reduces the scientific and technological production of the researchers.

Only those public institutions which manage to become lean, agile, flexible, with low costs and high efficiency and efficacy levels will live on to the next century. That is the goal for our company. EMBRAPA must therefore incorporate the conceptual and methodological instruments of "strategic administration", a new managerial posture which should permeate all levels of decision making within the company.

From that perspective, it will also be necessary to redefine the role of EMBRAPA headquarters, which should basically develop policy, directives and global strategies for the company, as well as working to support, follow-up, control, audit, evaluate the technical and financial administration and the aggregate activities of the company.

Cultural Dimension

A strong and consistent organizational structure was one of the factors which most contributed to the success of EMBRAPA in carrying out the mission given it in the development model established for Brazil at the end of the 1960s and early 1970s. One of the bases of that culture was the strong sense of responsibility the individuals felt for the institution.

As the national model for development wore out, the institutional paradigm and organizational culture which made EMBRAPA viable also wore out. Now new values which will constitute the pillars of that



culture must be found to up-date or substitute the old ones under the light of new values being defined by society within the environmental, social, economic, political and institutional transformations in course on the national and international scene. Up-dating the organizational culture of EMBRAPA is definitely a fundamental factor for making its modernization viable.

Political Dimension

Brazilian public institutions do not have a tradition of strong relations with other organized segments of society. Nevertheless, with establishment of the democratic regime in the country, the relationship between public institutions and other social segments linked directly or indirectly to their activities should be strengthened. In that context, EMBRAPA also needs to redefine its strategies for articulation with groups interested in its activity.

The social and political responsibilities of EMBRAPA to meet the different demands that come from different groups will only become clearer as the company begins to articulate with those groups. In that perspective, examples of activities EMBRAPA should strengthen are support to regional, state and municipal development programs and integration with the private sector.

The Human Resources Question

EMBRAPA was always recognized nationally and internationally for its strong training program. In the research activity today, priorities should be adapted to put greater weight on areas where there has been a "qualitative leap forward" in agricultural research, consequently increasing the



capacity for the country to compete technologically.

In the administrative activity of the company, however, there will have to be a great effort to recycle existing human resources and create greater technical capacity in strategic areas. Historically, EMBRAPA did not invest large sums in training human resources in the administrative areas or those meant to support research. Therefore, the level of training reached by the middle level of the company is not on the same level of competence that EMBRAPA is being pressured to act on.

Finally, there is a need to formulate a new job post and salary policy that can reflect and support the level of excellence in training human resources. It is also necessary to implement processes of performance evaluation that are transparent and more perfect. Besides stimulating productivity, the perspective of adequate training together with just pay and evaluation can become a strong factor for promoting greater individual loyalty with the organization, as the results of the global evaluation of EMBRAPA have shown.

The Managerial Question

Within the question of training human resources to make the process of modernizing EMBRAPA viable, the most critical bottleneck is found in the managerial question.

Unfortunately, the emphasis the company gave to training its researchers scientifically found no parallel in managerial

training for the administrators of science and technology. Excellent scientists were eventually allocated to the posts of research unit heads without having corresponding formal training in managing scientific institutions.

Today, even those few who had the opportunity to participate in some form of managerial training in the past are seeing the traditional models of management be scrapped by the swiftness of changes in society, by the turbulent environment in which the institutions are found and by advances in the sciences of behavior and administration. Therefore, new forms of managerial training, which go beyond sending individuals to formal, short, medium or long-term courses, will have to be developed.

Thus, the success of institutions will be a combined result of up-dated conceptual and organizational structure with the qualitative leap forward in the managerial training of its administrators. Therefore, managerial training will become one of the trademarks of the EMBRAPA human resources training program, which will use multiple instruments and procedures to meet the challenge completely.

The Question of Scientific and Technological Competitivity

The most competent way for EMBRAPA to contribute to greater competitiveness of the national productive structure is by increasing its own competitive capacity. That capacity will be built by a qualitative leap forward in scientific and technological capacity within the company itself.

Within a context of scarce resources, EMBRAPA should try to give that qualitative



leap forward by training its own researchers, its managers of science and technology and by rationalizing the institutional and human resources around the research units which present comparative advantages in the areas closely associated to the advances in their scientific and technological capacity.

For example, it would be practically impossible and not always wise to give all the research centers the infrastructure and human resources necessary to develop basic and applied research in biotechnology and genetic engineering. Thus, more institutional and human resources should be concentrated in the research center best adapted to that type of research. That approach is also coherent with the concept of "centers of technological, methodological and informational reference", which can have regional, national or international scope. Likewise, research programs can have greater or lesser scope according to the dimensions of the themes defined for them.

Finally, monitoring the advances of the scientific and technological frontier together with intensified relations with international research and development institutions are factors that will play an important role in the effort to increase EMBRAPA competitive capacity in science and technology.

The Research and Extension Question

Some of the changes taking place in the nation are changing the bases of the relationship between research and extension. Those changes are affecting the conceptual, organizational and administrative dimensions of the Agricultural Research Cooperative System (SCPA, constituted by



EMBRAPA research units, state agricultural research enterprises, integrated research programs from some states and some universities) and of the Brazilian Technical Assistance and Rural Extension System (SIBRATER, constituted by State Technical Assistance and Rural Extension Enterprises and by private technical assistance companies).

First, with extinction of the Brazilian Technical Assistance and Rural Extension Enterprise (EMBRATER), EMBRAPA was charged with coordinating SIBRATER. While it is an advantage and important to be able to coordinate the activities of generating and transferring technology, that duty will demand more than financial resources sufficient for coordinating and articulation activities.

Even though the research, technical assistance and rural extension activities complement each other, they work with different logic. Furthermore, in Brazil they were conceived and established in separate institutions and have therefore created different organizational cultures. The political decision to put coordination of both types of activities in the same institution did not eliminate the above-mentioned obstacles.

Furthermore, the institutional design of SIBRATER made rural extension state and municipal in character. Since the institutional arrangement of EMBRAPA cannot and should not be state or municipal, that fact should be an important consideration in formulating a new strategy to articulate the systems of research and extension.

Secondly, and more importantly, the new governors of some states have decided to fuse their state research enterprises with their state technical assistance and rural extension enterprises. Others are simply wiping them out and creating new institutions for rural development which include the activities of research and rural extension.

It should be understood that this type of change does not obey purely technical reasoning. If the movement gains followers around the nation, then it can be seen as a sign of changes that resulted from joining political and economic forces with only occasional attention to technical variables.

Within that context, EMBRAPA believes its role is to support the state research and extension systems, under whatever institutional arrangement they are given. Once the political decision to maintain them as they are or transform them has been taken, EMBRAPA should concentrate its institutional capacity on helping and strengthening the state research and extension systems.

After the state research and extension systems have been redesigned through the processes of merger, extinction, creation of new institutions, there will have to be a great joint effort to discuss and define the new strategies to coordinate and articulate the new versions of SCPA and SIBRATER that will emerge after the changes. Eventually, there may even emerge a new system that combines the two activities and could be called the national system of agricultural

research, technical assistance and rural extension, or simply the national system of agricultural research and development.

DIRECTIVES



In 1990 the current EMBRAPA Board of Directors defined six general directives to orient the beginning of its administration. While the results of the global evaluation of EMBRAPA, strategic planning and the debates that will be held in the company may add other directives, the ones below have molded the main initiatives of this administration.

1. Decentralize administration to the level of the research units, giving them more autonomy for action.
2. Greater integration of EMBRAPA with the other institutions in the Cooperative Agricultural Research System (SCPA) and with the Brazilian Technical Assistance and Rural Extension System (SIBRATER).
3. Promote a qualitative leap forward in national agricultural research, with emphasis on high tech areas like biotechnology, genetic engineering, agricultural ecology, computerized agriculture and genetic resources.
4. Support regional and state development programs.
5. Increase and fortify activities for diffusion of technology.
6. Integration with private enterprise.

PRIORITIES



Given the demands coming from different social segments, from new agricultural ecology, social and economic challenges to the country, and given the generalized lack of

resources in the public sector, it is necessary to define a set of priorities in different dimensions to concentrate the majority of the institutional and human resources of the company on making it viable.

Our administration believes the following questions should be given priority: institutional modernization, the qualitative leap forward in research, productive modernization, food security, environment, the small farmer and regional questions. Below, each of these general priorities is broken down into specific ones.

Institutional Modernization

1. Promote and stimulate the managerial capacity on all levels of administration in the company.
2. Create, develop and stimulate the career of manager of science and technology as a prerequisite for the company to attain a level of international quality in the administration of science and technology.
3. Formulate and implant a modern human resources policy that takes strategic aspects - like valorization of employees, better interpersonal relations, job environment and conditions, stimulation to creativity and productivity - into consideration.
4. Formulate and implant a new company job description and salary policy capable of correcting distortions which already exist and of reaching the level of qualification considered necessary for the human resources.



5. Formulate and implant transparent systems, adapted to the reality of the company, for evaluating performance of human resources.
6. Increase and strengthen the continuous training program in the company, with emphasis on training in service and short courses, aimed at up-dating the human resources.
7. Promote decentralized administration of activities which can give the research units greater agility, efficacy, productivity and quality in performance of their missions.
8. Fortify the Headquarters' activities of formulating policies, directives, priorities and global strategies for the company, as well as the duties of coordinating initiatives, promoting good relations with the system and supporting, following, controlling, auditing and evaluating the aggregate activities of the company.
9. Conceive and implant a computerized system of company activities, by creating data and documental data bases on the administrative, technical-scientific and managerial levels.
10. Conceive and implant a continuous evaluation system in the company, based on the concept of "integrated auditing", whereby the administrative, financial, bookkeeping and technical areas would be audited together and become an effective managerial resource and a mechanism to measure the advances for the qualitative leap in our technical and scientific capacity and our capacity to administer science and technology.

11. Formulate and implant policies and general directives for strategic areas - like national and international cooperation, marketing and sales, communication, research and development and fund raising.
12. Strengthen EMBRAPA in its duty as an instrument of agricultural policy.
13. Make EMBRAPA a protagonist in the process of defining national policies for agriculture, agro-industry and for the agricultural and forestry science and technology.
14. Fortify EMBRAPA relations with the major scientific societies, science and technology institutions and committees and research funding organisms existent in the country and abroad.
15. Re-adapt the conceptual, organizational and administrative models of the company to bring it up to date with the changes in the environmental, economic, political and social areas taking place in Brazil and the world.
16. Deepen the discussion on whether the corporate laws of the company should be changed to permit greater participation by "research associates", either from the public sector or private enterprise.
17. Create the figure of an "Ombudsman" in the company to watch over the integrity of administration actions and decisions and defend the interests of those who feel they have been hurt by the results of those actions.
18. Create a code of ethics that shows the social responsibility of the researcher

and makes explicit the ethical dimension of the relations between research and society.

19. Establish mechanisms which guarantee participation of different social segments interested in the discussion and definition, follow-up and evaluation of research and development policies and priorities (examples of those mechanisms can be the Regional Councils and Research Unit Councils).

Qualitative Leap Forward In Research

1. Emphasize technical-scientific training in high tech areas within the context of the new scientific and technological revolution, such as: biotechnology, genetic engineering, computerized agriculture, agricultural ecology, agricultural instruments and genetic resources.
2. Introduce the concept of "technological, methodological and informational reference center" to give incentive to the research units to make the most of their strongest points and become reference centers on the regional, national and/or International level.
3. Strengthen the Decentralized Units whose research activities are associated to areas of the qualitative leap forward in research and which have comparative advantages in institutional and human resources in those areas, so that they can become reference centers for the other units of the SCPA in the process of making that priority viable.



4. Promote and support formulation of interdisciplinary and inter-institutional projects that can better capture the complexity of the reality and join the maximum of competence in confronting the agricultural ecology, social and economic challenges to Brazilian agriculture.

Productive Modernization

1. Support Federal, State and Municipal governments in the search for greater technological competence for the nation's agriculture and agro-industry.
2. Contribute to the formation of a new technical base to promote modernization of the productive structure of national agriculture and agro-industry by generating and diffusing technologies aimed at producing new gains in productivity, quality and competition for the country's agricultural and forestry products aimed at the national and international markets.
3. Promote the generation and diffusion of technologies aimed at conquering future markets for which Brazil has comparative natural or potential advantages.
4. Introduce into research projects and programs the approach which shows the interdependence of the different sectors of economy through incorporation of concepts like "complexes" and "chains".
5. Establish mechanisms which stimulate participation of private enterprise in financing research aimed at meeting the

specific demands of segments with the most capital while assuring EMBRAPA has the autonomy to fulfill its social duty to meet the demands of those segments with less capital and less political representation to defend their interests.

6. Fortify the generation and diffusion of technologies aimed at optimizing the use of national or regional factors of production.
7. Emphasize the generation and diffusion of technologies aimed at increasing the income and reducing the risks of agricultural and forestry activities to insure greater private investment and allow the State to reduce its paternalist actions.
8. Use sets of technical-scientific information generated by the company to serve as planning instruments, aimed at reducing risks in agricultural and forestry activities.
9. Promote generation and diffusion of technology aimed at increasing income of agricultural, gathering and pastoral activities to increase the productivity of rural labor and reduce the migratory flux from the countryside to the city.
10. Formulate a program to integrate the SCPA with Brazilian universities, to promote the "qualitative leap forward" in the professional training of those who will soon act in the Brazilian rural sector, around research projects and programs of mutual interest and on the post-graduate training level.

11. Formulate a program to integrate SCPA with SIBRATER in order to promote a "qualitative leap forward" in training rural workers.
12. Promote and support actions aimed at a "qualitative leap forward" in managing production units and in Brazilian agribusiness.
13. Anticipate alternative scenarios for Latin American economic integration and project their potential implications on Brazilian agribusiness.
14. Give incentives to research aimed at using micro-organisms and beneficial insects as "new modern resources" to meet economic, social and environmental objectives, as in the case of bacteria which fix nitrogen in soil and insects used in biological control practices.

Food Security

1. Promote generation and diffusion of technologies aimed at assuring increased productivity, greater quality and reduction of risks in producing basic food stuffs.
2. Formulate projects and programs aimed at generating and diffusing post-harvest technologies for food crops.
3. Formulate interdisciplinary and inter-institutional projects aimed at identifying and understanding the strategic "complexes" and "chains" for the food security of the country, in order to map the bottlenecks which, in turn, should be

used as the basis for new research projects to overcome them.

4. Increase the technological capacity of the country to guarantee harvests that are always above the real demand of the Brazilian population.

Environment

1. Use the concept "self-sustained development" as a reference for drawing up projects and programs to generate and diffuse agricultural and forestry technology.
2. Promote the generation and diffusion of *technologies aimed at increasing conservation of the natural resources of the country.*
3. Promote the generation and diffusion of technologies aimed at increasing the number of rational options to better use the areas where the forest has already been raised and recuperate degenerated areas.
4. Promote and support the formulation and implementation of projects and programs aimed at reverting the tendencies toward *environmental deterioration.*
5. Promote and support formulation of emergency projects and programs aimed at acting in critical environmental areas, such as in the process where certain areas become deserts, with evidence of *genetic erosion and/or with species which are threatened with extinction.*
6. Promote and support formulation and implementation of projects and programs aimed at preserving biological diversity all over the national territory.

7. Promote and support formulation and implantation of "pilot projects" aimed at improving management of natural resources in general and of forestry management and soil conservation in particular.
8. Emphasize the formulation of projects and programs aimed at generating and diffusing technologies for integrated management of plagues and biological control.
9. Formulate and coordinate a policy to orient preservationist activities, use and exchange of genetic resources for Brazilian agriculture.
10. Elaborate a code of ethics to discipline, from the ecological and social standpoint, the relations between research and the environment.
11. Support the formulation and implementation of plans for environmental management to monitor the ecological impact of development actions.
12. Create an agricultural ecology, social and economic zoning of the strategic regions and ecosystems for the country in order to orient changes or formulation of policies and actions in the rural area which have ecological implications.

Small Farmers

1. Increase and strengthen the process of generating and diffusing technologies aimed at meeting the technological demands of small farmers and which are adequate to the agricultural, environmental, social and economic

conditions which influence the small farmer's performance.

2. Support formulation and implementation of projects and programs aimed at organizing small rural producers in order to make diffusion of technology easier.
3. Support projects and programs of agrarian reform by transferring productive and managerial technology to the relocated small farmers, so they can be successful in a competitive economic activity.
4. Emphasize generation and diffusion of technologies aimed at increasing the productivity of family labor and the income of small rural producers.
5. Promote and support projects and programs aimed at increasing the technological and managerial training of small farmers in order to help them move up the social ladder from the rural lower class to the rural middle class.

The Regional Question

1. Emphasize generation and diffusion of technologies aimed at conserving and taking full advantage of the comparative natural advantages of each region of the country.
2. Strengthen the process of generating and diffusing technologies aimed at reducing regional disparities.
3. Formulate production systems within the regional approach which considers the ecosystems, landscape units and geo-environmental units predominant in each region of the country.

4. Conceive and organize research programs around broad concepts like "region", "ecosystem", "landscape unit" and "geo-environmental unit", no matter what the scope of the research center: state, regional or national.
5. Support regional and state development programs without making the company institutional model based on the state unit.
6. Conceive a better institutional arrangement for the company to meet specific demands of different regions of the country, in harmony with the different agricultural, ecological, social and economic challenges that each region poses for national agriculture and agro-industry.
7. Promote and support formulation and implementation of projects and programs aimed at strengthening the system of agricultural research and rural extension in less-favored regions.

CONCLUSION



The challenge is before us. We must bring EMBRAPA up to date with the ecological, social, economic, political and institutional changes taking place in the country and the rest of the world; but we must also make it the protagonist of its own change.

Such an effort requires the participation and commitment of all those who make up the company. That is why we offer our vision and our contribution to redefining the institutional paradigm of EMBRAPA. Now we all have a reference document to serve either



for a deeper constructive debate or to put changes into practice.

Collective competence and courage are necessary to take agricultural research toward the XXI Century, especially when less than 10 years separate us from the year 2000. That is the challenge we are all convoked to meet.



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