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**DOMINICAN REPUBLIC COUNTRY PAPER**

Submission by the Ministry of Agriculture  
 Dominican Republic

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**UNITED NATIONS**

ECONOMIC COMMISSION FOR LATIN AMERICA Office for the Caribbean



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### INTRODUCTION:

The Dominican Republic has been experiencing one of its most interesting periods in history. In the political sphere there has been an increasing strengthening of the national democratic System which is reflected in greater respect for public liberties and human rights in general, and in spite of the major economic problems affecting us, there is a reflection of a desire to promote by all possible means a development which will end the poverty affecting large sectors of the nation.

The development planning activities of the Government have been increasingly improved thanks to a higher national consciousness and this has been reflected in greater effectiveness in the actions carried out.

In the field of science and technology this progress has been significant especially in the agricultural and forestry sector. This is evident from such concrete acts as the creation and operation of the Department of Science and Technology in the National Planning Office, the reactivation of National Council on Agriculture which has been presided over by the President of the Republic, Dr. Salvador Jorge Blanco, recent measures to regulate land use especially those for the use of forest and thus promoting the recovery of this important sub-sector, and the establishment of the Dominican Institute of Agricultural Research (IDIA).

This report gives a brief review of the efforts and successes achieved in respect of policy and management of agricultural and forestry research.

## 2. AGRICULTURAL RESEARCH POLICY IN THE COUNTRY

### 2.1 Procedures for the Formulation of Research Policy and Selection of Priorities

One of the areas to receive great attention from the Government has been that of improving planning methodology in general, starting with the outline of lineaments of clear sectoral policies.

In this respect, the National Science and Technology Council (CONACYT) and the Department of Science and Technology of the Technical Secretariat of the Presidency have played an important role. The latter institution sponsored a diagnosis of the science and technology activities undertaken in the country by various public and private institutions starting with the agri-forestry sector.

There are several levels of planning starting with the National Planning Office which plays a multisectoral role. On this level general policy guidelines are given and from these sectoral responsibilities derive. The State Secretariat for Agriculture (SEA) has a Technical Under Secretariat for Agricultural Sectoral Planning (SEAPLAN), which disaggregates sectoral policies in the various sub-sectors.

The Under Secretariat for Research Extension and Training (SEIECA) is charged with the execution of agricultural research policy through the Department of Agricultural Research (DIA) which is in itself the national unit responsible for official agricultural research activities.

The system of research planning of DIA is designed as a flexible instrument oriented to serve as a guide for the implementation of research activities, as a function of the policy guidelines outlined at the Central Government level and the agricultural sector. It is conceived as an integral element of the work of the services of the Departments of the Under Secretariat of State for Research, Extension and Training among themselves and with the other services of SEA and is an effective part of the planning system of SEA. This planning system has several instruments, each one on a separate level with respect to the disaggregation of objectives, spectrum of activities and temporal outlook. The central instrument is the National Research and Extension Plan (PLANIE) which is formulated at the level of the Under Secretariat for Agricultural Research, Extension and Training as a summary and guide of the activities for which this Under Secretariat holds responsibility.

With specific relation to research activities, the system is composed of processes culminating in the formulation of the National Agricultural Research Plan (PLANIA) and the Annual Working Plans. PLANIA represents the first step in the specific disaggregation of the PLANIE and is global, essentially normative for medium and long term and of a recurrent nature, which permit adjustments and corrections over time. The Annual Work Plan is the main mechanism through which medium and long term plans and programmes are adjusted. These two instruments provide the basis for selecting the relative priorities among programmes and within these among projects<sup>t</sup>, and on the other hand shapes these priorities in allocating available resources. They also form the conceptual base for the follow-up and evolution of research activities.

The elaboration of both instruments is the formal responsibility of the Department of Agricultural Research (DIA). It is by means of this participation that research received the guidelines and priorities of agricultural policy to which it must be adjusted. In addition, in this process DIA promotes the participation of other units concerned with research such as extension and other agricultural, producer and industrial services, thus is achieved a most realistic vision of the existing problems. This therefore results in a synthesis of problems, priorities and available resources which are concretized in the National Plans (by crop) which summarize all the objectives and activities to be developed under each heading.

In the Annual Work Plan the initiatives of researchers are made compatible at the level of research centres with the policy guidelines and priorities already discussed. It is for the operative units (research centres) to formulate technical proposals for the execution of programmes, projects and activities focused within their sphere of influence. These in turn are made compatible at the level of each centre and presented to the National Office of DIA where integration is effected at the national level and channelled

to higher levels of the planning system through SEIECA and SEAPLAN. Thus the global and medium term plans contained in the Programmes of PLANIA are produced through research related to specific producers and at the same time are integrated and made compatible with the rest of the agricultural serviced offered by the State.

## 2.2 Criteria for Selecting Priority Research Objectives

The priorities for agricultural research are derived, as I already explained, from sectoral policies, among which self-sufficiency in food and import Substitution of agricultural products are considered essential. In this respect, the items which receive greatest emphasis are rice, corn and sorghum, edible fats (peanut, coconut, soya and oil palm). Completing the chart are edible legumes (red and black beans and pigeon peas) and roots and tubers (cassava, sweet potato, yam and potato). Vegetables and fruits receive emphasis in specific regions.

With respect to cattle research priorities are meat and milk production from pasture (grass and leguminous), use of sugar cane wastes and other agricultural by-products. Special attention is given to pig feed since the country is engaged in rebuilding the pig stock following the eliminattion in the entire country due to African Swine Fever which occurred at the beginning of 1978.

## 2.3 Resources devoted to Agricultural Research

### 2.3.1. Finacial Resources

The Dominican Republic is not unaffected by the World economic crisis. In fact, according to the Inter American Development Bank (IDB), the Dominican Republic has been one of the countries most seriously affected by the economic recession which has been responsible for a considerable reduction in the already reduced resources devoted to research in general.

Budgetary allocations in the last few years have decreased to 3 million Dominican dollars (1 \$RD = 1 US\$) in 1979 to some 1.9 million for 1983. The present allocation represents only .27% of the gross value of production which is very low. We hope that with the new activities being developed that this may be doubled in the coming year.

Table No.1 presents a global picture of the available physical resources in DIA.

### 2.3.2 Scientific and Human Resources

The Department of Agricultural Research (DIA) has technical and scientific personnel numbering 160 and support staff of about 450.

There is at present a training project at the post-graduate level and this will increase the capacity (quantity and quality) of scientific staff. More will be said about this in point 5.

## 3. ORGANIZATION AND STRUCTURE OF THE NATIONAL AGRICULTURAL RESEARCH SYSTEM

### 3.1 Present Structure of the Office of DIA

The Department of Agricultural Research is within the administrative hierarchy of the Under Secretariat for Agricultural Research, Extension and Training of the Secretariat of State for Agriculture (See Figure No.1). The DIA is divided into operative units being Six research Units with specific and defined geographic areas. They are the following:-

- i) South Agricultural Development Centre (CESDA), located in San Cristobal, with a multiproduct mandate and its area of influence the southern and eastern zones of the country. It has seven dependent experimental stations.
- ii) North Agricultural Development Centre (CENDO) located in Santiago de los Caballeros with a multiproduct mandate and its area of influence the northern zone of the country. It has nine dependent experimental stations.

- iii) Rice Research Centre (CEDIA) located in Juma, Bonao, with specific mandate in rice at national level.
- iv) Cattle Research Centre (CENIP), located at Kilometre 23 of the Antopista Duarte with specific mandate in live-stock, pasture and fodder - to serve nationally.
- v) Centre of Applied Research to Arrid Zones (CIAZA), located in Azua, with specific mandate over arrid zones and to serve nationally although with concentration in its immediate environs the plains of Azua.
- vi) National Centre of Appropriate Technology (CENATA), located in Ponton, La Vega, with mandate in the field of appropriate technology and non-conventional energy - to serve nationally.

CESDA, which was originally established as the National Agricultural Research Centre (CNIA) to serve nationally and at one time headquarters of the Under Secretariat for Research and Extension of DIA, is the Centre which has suffered most changes and adjustments to achieve its present structure. Also, through its origin and location near to the Capital, it has been and continues to be submitted to the pressures of political influence, CENDA and CEDIA present a different image especially relating to the work and influence of a political nature. In both cases the institutional structures which led to their establishment seemed to be discharging a role of prime importance. In the case of CENDA, its origin as a Centre of a private nature,\* materialized later on becoming a dependency of the Secretariat of State for Agriculture in the form of a Governing Council comprising both public and private sector participation, has permitted greater continuity which is evident in its programmes and at the same time, it has also served as a link between research and political levels and active regional efforts. In the case of CEDIA, its continuity arises from the presence of the Mission of the Republic of Taiwan which has been in the country since 1963 as part of a technical co-operation

\*(See bottom of next page for footnote).



agreement between the Government of the Dominican Republic and the then Republic of Nationalist China.

The Creation and development of CIAZA followed a different pattern since that centre was born from the necessities of a specific development project (Project "YSURA") of the Dominican Agrarian Institute (IAD), originally established as an experimental service. Subsequently and given the economic importance of the Azua Valley and the country's arid zones in general, its mandate was expanded to what it covers at present.

CENIP is the result of a process of development by stages beginning with the creation of the Pasture and Fodder Programme in 1970 within the then National Centre of Agricultural Research (CNIA), at present CESDA, until the creation in 1980 of the present CENIP and an independent centre within the structure of the Department of Agricultural Research. At the same time, the situation of CENIP also clearly exemplifies the fluidity and instability of institutional relationships within the present system. In October 1982, without further preamble or analysis, its institutional dependency was modified and it became part of the Under Secretariat of cattle Production thus become separate from the rest of the country's research system. Finally CENATA which is not a dependency of DIA but rather of the Under Secretariat for Production and Marketing, operates with greatest independence and is responsible for generating and adapting appropriate technology especially in the field of energy and small machinery and equipment.

\*CENDA IN 1964 began as the Division of Agricultural Research of the Higher Institute of Agriculture and then in 1974 it became the Centre for Agricultural Development as a dependency of SEA.

From an operational aspect this structure is highly decentralized with each centre enjoying a high degree of initiative and administrative independence. This permits greater flexibility for the development of research programmes as a function of the problems of its areas of specific influence and for the establishment of collaboration with other institutions and producers whom they serve. Examples of these advantages are, among others, common programmes and projects advanced by CENDA and the Higher Institute of Agriculture (ISA) in Santiago and the collaboration established between CIAZA and the tomato industries in The Azua Valley. This high level of decentralization together with the geographic coverage and the mandate of the centres, represents one of our greatest potential resources in terms of achieving a system that will effectively meet the country's present and future research requirements.

The low administrative hierarchy of the DIA at times minimizes the advantages offered by the independence of the centres since in practice, it is difficult to control programme execution as well as to ensure that the priorities fixed in the plans are executed in that way.

This administrative structure has been studied by the country with the co-operation of the International Service for National Agricultural Research (ISNAR). This analysis explored the activities undertaken by DIA as well as their effectiveness. As a result of the recommendations of that exercise, it was proposed to create the Dominican Institute of Agricultural Research (IDIA), and it is hoped that this will begin operations early in the coming year. We believe that this is another example of the impetus that these agricultural research activities are receiving in order to make them a more efficient instrument at the service of national development.

3.2 Other Institutions comprising the National System for the Generation of Agricultural Technology.

3.2.1. University Research Programmes

The development of research activities at the university level one of the potentially most important elements for achieving greater efficiency in the use of the resources available for agricultural research. Several aspects justify this statement. The first of these is directly linked to better utilization of the total inventory of manpower in the country. In general, Universities have personnel qualified at the highest levels (M.Sc. and/or Ph.D) who enjoy greater working stability than personnel of SEA, both aspects being of crucial importance for the development of medium and long term research programmes. On the other hand, at the university level it is possible to implement projects which it would be difficult to justify within the specific production-oriented interests which predominate in SEA, but which are essential for improved management of the technological policy of the country, as for example, studies on the adoption and impact of the use of new technologies, topics of a somewhat speculative nature relative to the better use of the country's natural resources, etc. Likewise, the greater diversity of specialized subject areas that the University must maintain as part of its training programmes (marketing, food technology administration, etc.) offer possibilities for research in a number of important areas which are virtually absent from the technical capacity of SEA.

Within this framework, there are at present in the Dominican Republic two types of research efforts in which universities and educational institutions participate (a) specific research projects and (b) theses of students at the level of agronomist engineer.\*

\*(see next page for footnote).

Both types of activities exist in all the Universities but doubtless ISA in Santiago and the Autonomous University of Santo Domingo (Faculty of Agronomy and Zootechnics) are those which have a greater thrust and current level of activities. In the case of the National University Pedro Henríquez Ureña the bulk of effort is concentrated on the students' degree theses.

At ISA research activities have a dominant role; exemplified clearly by the relation of this institution with the creation of CENDA, a centre with which it has maintained and continues to maintain close contact, sharing laboratories and other physical facilities. The main point of collaboration is on the level of ISA students and lecturers in projects of CENDA and technicians of CENDA in teaching activities at ISA. Relationships of this kind are also maintained with CEDIA with whom a joint project on rice improvement is maintained, relations are also maintained with the other centres but essentially on the level of degree thesis.

In terms of specific Projects at ISA, there is neither a structured medium or long term programme nor financing dedicated to these activities. Initiatives are considered individually and execution depends on whether the necessary financing is obtained.

\*These two activities are generally intimately linked given that in all research projects important components are the theses which must be prepared as a requirement for the degree of Agronomist Engineer. Nevertheless, it is necessary to consider them separately in their different implications from the aspect of their contribution and the use of available human resources.

The Autonomous University of Santo Domingo develops the bulk of its research programme at its Experimental Station attached to the Campus of the Faculty of Agronomy in the vicinity of Santo Domingo. In this experimental projects are advanced both in the agricultural area as well as those related to Zootechnics and animal production. At present a group of projects is being developed and will have room for more than 50 works on theses of the students of the faculty. Moreover, they collaborate with various centres of SEA, also with an increase in the number of students developing their theses on research included in the programmes of the centres, particularly CESDA + CIAZA.

The functioning - Selection of projects, programmes, etc. - of research activities in CIASD is similar to that at ISA, although in relative terms, the priority assigned to them is much less, since the research programmes are planned essentially as a complement to the education programmes. This is explicit in the salary policy of the university in which the time devoted to research has a lower level of remuneration than that devoted to teaching and in resources practically nil which the university allocates to this type of activities which must be financed almost in their entirety from external resources. There is also evidence of a lack of physical resources - laboratories, etc. - adequate for research and this substantially limits the existing potential.

The Secretariat of State for Agriculture has in the past played a very important role in the development and exploitation of the resources which the universities have available for research. This was done through the funds of the National Programme of Agricultural Development for the small Producer and the Office for University Co-ordination of SEA. These elements have been important both from the point of view of having mobilized resources which would otherwise have been unutilized as well as for having laid the basis for the development

of collaborative efforts between the Universities among themselves and with other organization and centres of the official sector. In fact these efforts have been reduced through lack of resources but experience is available and represents an important potential for future actions.

### 3.2.2 Efforts of the Private Sector

The efforts of the private sector in the area of generation and transfer of technology go back practically to the origin of the Research System with the creation by the Association for the Development of Santiago of the Division of Agricultural Research in ISA, today CENDA, and the first efforts of the Gulf and Western Company in the area of improvement of sugar cane.

Indeed these efforts have been significantly expanded and although they still represent a relatively small percentage of the total of the activities, its potential importance is considerable. This is due to the role that this type of effort can play in (i) increasing the volume of resources available for research and transfer of technology and (ii) achieving a better and closer linkage between the research system and the clients and potential users of these results.

In outline, the participation of the private sector in research and transfer of technology is effected in two different ways: direct execution of research activities and participation by means of financing.

Among the first should be mentioned:

- (a) Research activities of the agricultural complex of Gulf and Western. These activities are developed as support to their activities in the sugar field (introduction and improvement of sugar cane species) and in cattle rearing, an area in which a new breed "Romana Red" has been developed, and they have advanced work in the development of technologies for fattening cattle in semi-confinement, using by-products of the sugar industry and other locally produced feed.

At present as a result of the diversification of their agricultural activities they are also getting into citrus and into the adaptation of varieties of potatoes, beans and vegetables;

- (b) The activities developed by the Research Centre on Animal Production (CIMPA). This Centre, directed by an administrative council, in which are represented many institutions of a private nature - Association for the Development of Santiago, and others -- and official -- such as the Secretariat of State of Agriculture -- is located near to Santiago in the Valley of Cibao and focuses its activities more on practice than on research. In this area, its main projects are recovery and improvement of Dominican creole dairy cattle and recently works in feeding linked to the programme to restock pigs.
- (c) The activities of the firms supplying agro-chemical inputs (Fertilizers, herbicides, etc). Among these, the activities of the Fertilizantes Químicos Dominicanos (FERQUIDO) (Dominican Chemical Fertilizers) stand out; this company is developing an intense programme in Soils and Fertilizers as support for its commercial activities and customer services. This programme includes an advanced information management system and financing theses of agronomy students..
- The second type of effort, participation through Financing, represents the area of greatest future potential since through this it would be possible to increase available resources and also better utilize existing human and physical resources without superpositions. In this area, there are also some examples which bear mentioning. Outstanding among these, in the case of non-profit organizations, is the Association for the Development of Santiago, Inc. which gives active support to the activities of ISA and CIMPA in various fields. With respect to commercial organizations,

the support of the tomato processing industry, to programmes of CIAZA and that of Molinos Dominicanos to ISA for their studies on Sorghum substitution in wheat flour are clear examples of the way that this type of relationship can contribute to strengthening the research system, providing continuity of activities and better interrelationship between researchers and potential users of the results of research.



4. MANAGEMENT OF AGRICULTURAL RESEARCH PROGRAMMES  
AND PROJECTS.

4.1. Proceedings for Planning Research Programmes  
and Projects at the Operational Level.

The present thematic structure of research activities in the Dominican Republic result from the programming summarized in the 1980 PLANIE and the 1980-82 PLANIA. In these instruments is recognized that the main objectives of research are to contribute to the increased availability of basic food, improve the exportable balances of traditional exports and in general to improve the standard of living of the Dominican farmer. This is reflected in a global structure with emphasis on food crops focused on production systems. On the global level PLANIE envisages the following five programmes:

- a) Agricultural Programmes by crop: Rice, corn, sorghum, bean, peas, peanuts, soya, coconut, plantain, coffee, cocoa, banana, fruits, potato, casava, sweet potato, yam, tannia ("yautia") and greens.

The agricultural programmes by crop is oriented towards developing technologies tending mainly towards increasing production. To achieve this objective their actions are aimed at executing field and laboratory tests in two main areas:

- i) Plant breeding, with strong emphasis on achieving greater productivity through the use of selections resistant to the main diseases and in some cases to insects which attack and cause severe crop damage. In this area the main strategy centres on using local germ plasma as well as germ plasma from the majority of international centres and other institutions producing and/or exchanging germ plasma.
  - ii) Agronomic tests, with emphasis on search for increases in production through improved farming practices, especially times and systems of sowing, densities and management of crops in general.
- b) Livestock Programmes: Pasture and fodder, cattle, pigs, goats/sheep, poultry.
- These focus primarily on emphasizing meat and milk production for which their activities are aimed at maximum utilization of hybrids with high productivity and selective breeding of creole cattle. The projects of this programme also include animal breeding in aspects related to animal production, physiology, animal health and above all selection improvement and adaptation of local or introduced pastures.
- c) Livestock programmes also include other operations peculiar to Dominican production systems such as breeding and control of goats. In this case the specific orientation is towards semi-arid zones.

- c) Exploratory programmes by crop: castor-oil plant, African palm, sesame, "caupi", wheat and cotton.

The research projects in this programme are mainly aimed at seeking possibilities for cultivating non-traditional plants with potential as a means of filling internal demand and widening export possibilities. Examples in these areas are the present effort to introduce and control African palm and wheat as a means of reducing the heavy deficit in oil and wheat flour respectively.

- d) Programme of technological projects: Production systems, genetic control, environmental management, disciplines, soils, plant pathology, entomology, parasitology, herbology, product handling, socio-economics.

The programme includes multidisciplinary research projects. The role of the disciplines in the programme is a priority but a support to the crop experiments. Projects implemented in this programme are oriented to support to laboratory and/or office services as part of the research process. The present emphasis is on plant protection and increase in production through the use of fertilizers.

e) Programme on Transfer of Technology:

Included in this programme are projects on validation and transfer of technology; these projects are prepared with the Department of Extension and Education and are executed either in a joint venture or solely by the extension service.

4.1.1. Agricultural Research

With respect to agriculture the 1980-82 PLANIA gives priority to the development of the following national programmes: rice, edible legumes (beans and peas), musaceous plants (plantain and banana), roots and tubers (sweet potato, yam and tannia), corn and sorghum, oleaginous plants (peanut, coconut), coffee, tobacco and cacao. Although the inclusion of crops may seem excessive in the light of available resources, not all carry the same weight, and priority is given to those of greater import on the national diet (rice, haricot, plantain, greens) and traditional exports (coffee, cacao, tobacco).

The extreme national agroecological variability and the diversity of production systems existing in the country pose a serious problem from the point of view of maintaining a balanced service. Certain crops may be of no importance on the national level but may be key elements within determined conditions of production and should therefore be researched. On the other hand,

the need to give attention to multiple objectives; internal demand, export and import substitutions, also requires inroads into specific areas or those with potential, the case of certain oleaginous crops and wheat fall within this last situation.

The main problem is rooted in the possibility to realise a minimum critical quantity to achieve some impact in each of the situations to be covered. This is a problem of availability of resources and they have been and continue to be a restricting factor in the Dominican system; in the future therefore adjustments will be made not only to the programme coverage but also to the framework of the objectives in respect of what is expected from research. This will avoid the system being judged on the basis of obtaining results which are not within its possibilities.

On focusing the programmes by crop there is a clear indication towards research in the field of plant breeding and within these to tests of selection of genetic material from international centres and programmes. Such is the case in their relationship with IRRRI and CIAT; in legumes with CIAT and the Bean Programme (with United States university), in casava with CIAT; and in corn and wheat with CIMMYT, this is very useful and this policy will be continued with every breeding programme. It will however be a question of using advanced material of international programmes in conjunction with local germ plasma so that in the minimum time it will be possible to obtain new varieties which will adjust to the agro-ecological conditions of

the Dominican Republic. The focus of the rice and haricot programme is an example of the interaction which will be followed. In the case of rice CEDIA through continuous crossing will make available to the farmer Juma varieties which are most used and which have Dominican stock of varieties coming from local selections especially Tono Brea and English.

In the case of haricot, advanced lines with high yielding stock, are being crossed with national selections with excellent results.

4.1.2.

Disciplinary Research and Complementary Programmes:

Disciplinary research (entomology, plant pathology, nematology, soils, etc.) are included within the programmes by crop, thus the specialists in the different disciplines participate in the planning, implementation and relevant co-ordination in their field of competence.

With respect to the production of hybrid and foundation seeds there does not exist a programme as such, each of the research programmes by crop produce the necessary hybrid material and in certain cases they also produce the foundation seeds which serve as the base for the production of registered or certified seed. Recently Units of Basic Seeds have been established in each Centre; these units will be responsible for supporting breeding programmes in the maintenance and control of seeds.

One research area that has been receiving considerable importance, although not yet with the intensity that the problem deserves, is the management of irrigation water and drainage. The major concentration is being developed in CIAZA where research is being done on irrigation and water consumption in the crops of the area. CENDA is also developing a project on this important aspect.

In the area of production systems development is incipient and research is in the initial stages of identifying and describing the systems prevailing in each region. These efforts will be strengthened with the implementation of a project in co-operation with CIID.

4.2.

Composition of Budgetary Expenditure.

The percentage distribution of the budget by object of expenditure of DIA for the period 1979-1983 is presented below:

SECTION	Years				
	1979	1980	1981	1982	1983
Personal	76%	84%	86%	95%	97%
Operations	16%	13%	6%	4%	3%
Capital expenditure	8%	3%	8%	1%	0%
Total	100%	100%	100%	100%	100%

As may be observed the situation of the percentage expended on operations is very far from advisable (15 - 20%), the problem becoming more acute in the last two years. This reflects the crisis through which the country has been passing. This is one of the basic reasons for the establishment of IDIA and it is to be hoped that it will be corrected early.

## 5. DEVELOPMENT OF HUMAN RESOURCES

### 5.1. Human resources for Agricultural Research

The Department of Agricultural Research has a staff of 970. Of these 164 are scientific and technical personnel, some 456 administrative and support personnel and some 350 field hands.

Chart No.2 shows the number of researchers with their academic level for the Research Centres and the Main Office of DIA. The universities have staff who do research, these include 39 Professionals at the M.Sc. level and 3 with Ph.d.



A balanced analysis of the present needs of technical and scientific personnel for the country's National Agricultural Research System, including DIA and the universities produced the results appearing in Chart No. 3. Training of this staff will be financed by a co-operation project with USAID and will be put into operation in January 1984. It is clear that these efforts will significantly increase the quantity and quality of available scientific personnel with which it is hoped to improve the results obtained and technology relevant to the crucial food problems facing the country.

Chart No.3 Priority areas for the Training Programme  
at Post-graduate level (1983-1988).

Discipline	Post-graduate Level	
	M Sc.	Ph. D.
1. Soils	13	3
2. Irrigation & Drainage	4	1
3. Agricultural Engineering	6	0
4. Education and Agricultural Extension (including rural Sociology)	7	2
5. Administration and Rural Development	6	1
6. Planning and Agricultural Economy	3	0
7. Plant protection	11	2
8. Agronomy	31	8
9. Animal sciences	10	1
10. Veterinary medicine	1	0
11. Forests	2	0
12. Food technology	3	0
<b>TOTAL</b>	<b>97</b>	<b>18</b>

Chart No. 2: Number and level of training of Technical Staff in the Department of Agricultural Research (1983).

	CESDA	CENDA	CENIP	CEDIA	CIAZA	De- part ment NAC.	Total/Level Training
Pd. d.	2	0	0	0	0	0	2
M. Sc.	13	4	8	0	2	2	29
with specialized courses of longer than 6 months	4	6	9	0	0	0	19
Agronomist Engineer	20	18	5	9	6	2	60
Chemical Engineer Chemists	14	3	4	1	0	2	24
Zootechnic Engineer	0	0	2	0	0	0	2
Doctor N.V.	0	0	5	0	0	0	5
Agronomist Technicians	8	6	1	7	0	0	22
Total per Centre	61	37	34	17	9	6	164

6. EXTERNAL RELATIONS AND INTERNATIONAL CO-OPERATION

For a country with its characteristics and the state in which the Dominican Republic is at present, international co-operation both at the scientific and financing levels plays a very important role. By itself a small country with limited resources may only see to a small proportion of its total research requirements, nevertheless, there is in other countries and on the international level a large amount of potentially useable knowledge. The experiences at international co-operation existing in the Dominican Republic are clear evidence of the benefits that may be derived from them. Some examples include country to country programmes as well as relation with international organizations.

Among the first type of relationship may be mentioned the Technical Co-operation Agreement between the Nationalist Republic of China and the Dominican Republic. This agreement has been operating since 1963 and is recognized as one of the main elements in the success achieved by the rice research programme developed by CEDIA. Agreements with the Federal Republic of Germany and the United States of America are also examples of successful co-operation.

The agreement with the Federal Republic of Germany has been in operation since 1973 and between that date and 1980 it concentrated its activities in the area of plant health in which it contributed to the training of technical personnel and laboratory facilities and equipment for the plant quarantine service and research on pest and disease control. At present efforts are concentrated on developing technical equipment and laboratory infrastructure and equipment for seed processing.

Various co-operation and support projects have existed and still exist with the United States of America. They have contributed substantially to developing physical infrastructure and human resources for the research system, an area where there has been active collaboration with several United States universities such as concrete research via placing United States scientists in the Dominican Republic. Some examples of these efforts are the collaboration in the development of physical and human resources in the Higher Agricultural Institute (ISA) of Santiago; the Small Producer Project (PPP) which was started in 1974 as a joint effort between USAID and the government of the Dominican Republic to promote the development of technologies adaptable to the conditions of small and medium producers;

and more recently the Haricot Research Project which is a part of the Co-operative Programme for Support to Research on Haricot and is having a major impact on that crop which is of such importance to the country.

In addition to these country to country relations the Dominican Republic at present also participates in and benefits from the activities of a number of bodies and international efforts. Among these must be mentioned the support that DIA receives from the International Centres of the Consultative Group on International Agricultural Research (CGIAR). Within this group, the International Centre of Tropical Agriculture (CIAT) keeps the programme more active although IRRI, IPC and CIMMYT also collaborate in specific areas. The country has received from CIAT germ plasma of rice from the Centre and which has been successfully launched commercially, exchanges are also made in materials in casava, haricot and pastures. Also technical research personnel of Rice, Casava and Haricot programmes have participated short term training programmes offered in Cali, Colombia. Relations with IRRI centre in the area of genetic improvement of rice, short term training and visit of experts.

Collaboration with IPC falls within the Regional Co-operative Potato Programme PRECODEPA, through which funds and technical support for research on potato are received.

On the regional level Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE), has been lending support to the Dominican Republic for several years, especially through short term training grants and post graduate grants for M Sc. programmes offered in Turrialba, Costa Rica. These relationships have been increasing from 1980 when the Dominican Republic became a full member of CATIE. At present CATIE is giving technical support in the area of production systems and in training where a programme of seminars and short courses is being successfully developed.

Other international organizations have collaborated and continue to collaborate by means of technical and financial assistance. Among these organizations, FAO and IICA have been collaborating in the field of generation and transfer of technology practically since the beginning of formal activities in this area since the decade of the sixties. IICA has collaborated in several areas including training programmes for technicians of research and extension services initiated in the sixties and more recently,

in various efforts related to planning, organization and administration of research as well as the execution of the technical assistance component of the PIDAGRO project.

FAO plays a major role in the development of what is today CENDA and at present is supporting CENIP in research on animal production, pastures and fodder.

The total contributions and support received through international co-operation has been significant as may be seen.

A negative aspect is that in general the country has played a positive role with respect to participation in project selection and its initiative which at times minimize its importance and contribution to institutionalize a process of internationalization of these experiences especially with respect to the identification of requirements and problems.



## 7. LINKS BETWEEN RESEARCH AND TRANSFER OF TECHNOLOGY

The activities related to transfer of technology in the Dominican Republic were initiated almost at the same time as the first formal efforts at research, with the establishment of the Agricultural Extension Service in 1962. The initial objectives of the Service were to promote integral development of rural families through technical assistance in agricultural production and the organization of groups of producers, housewives and rural youths. The basic philosophy of these first efforts required close linkage between research and the dissemination of new technologies both aspects being considered to be integral steps in a single process - that of generation and transfer of technology.

This concept is reflected in the constitution of the Under Secretariat of Agricultural Research, Extension and Training, whose main responsibility is the effective coordination and programming of public efforts in the field of research and transfer of technology. It was considered that locating both services within the same institutional environment would result in greater and more natural integration of these efforts and consequently a greater impact on the well-being of the rural population. In effect this joint effort would be realised through a plan of permanent collaboration and exchange of information in which the extension system would not only provide two-way communication between researchers and producers but would also participate actively in identifying problems and in carrying out field tests of new technologies. Similarly extension personnel are the ones who nourish research through information on the behaviour of new technologies once they have been adapted by producers. In practice, however, this integration has not been achieved and except in very special cases as in CEDIA, Tobacco and Cacao, links are very precarious and almost always based on personal situations.

Various aspects may be mentioned as linked to this situation: the first is related to the fact that since the establishment of the Department of Extension to the present time,

administratively on the Regional Directorates of Agriculture, while researchers are located in the Centres and Experimental Stations. This separation is also evident in the technical aspects in that there is a

very centres where the participation of extension is not formal but on the level of individual technicians.

An instrument which has had good results when well utilized has been that of Economic Testing Farms. In the case of CENDA there is a Unit which manages these farms with three basic objectives:

- (a) The researcher tests in farms the treatments which yield best experimental results.
- (b) The extension officer participates in the process and is informed of new technologies offering positive prospects.
- (c) Realistic production costs for the new technology are obtained.

Unfortunately this is an isolated case which it has not been possible to institutionalize.

## 8. EVALUATION

The Department of Agricultural Research is considering a Planning and Evaluation Unit at the national level; this unit will be responsible for providing follow-up and serving to control project implementation. In practice it has not functioned well especially, as was said before, because planning and financial control activities are separate. It is hoped to correct this grave administrative problem, one of the main problems which justified the establishment of IDIA.

FIGURE 1. Organizational Structure of the State Secretariat for Agriculture

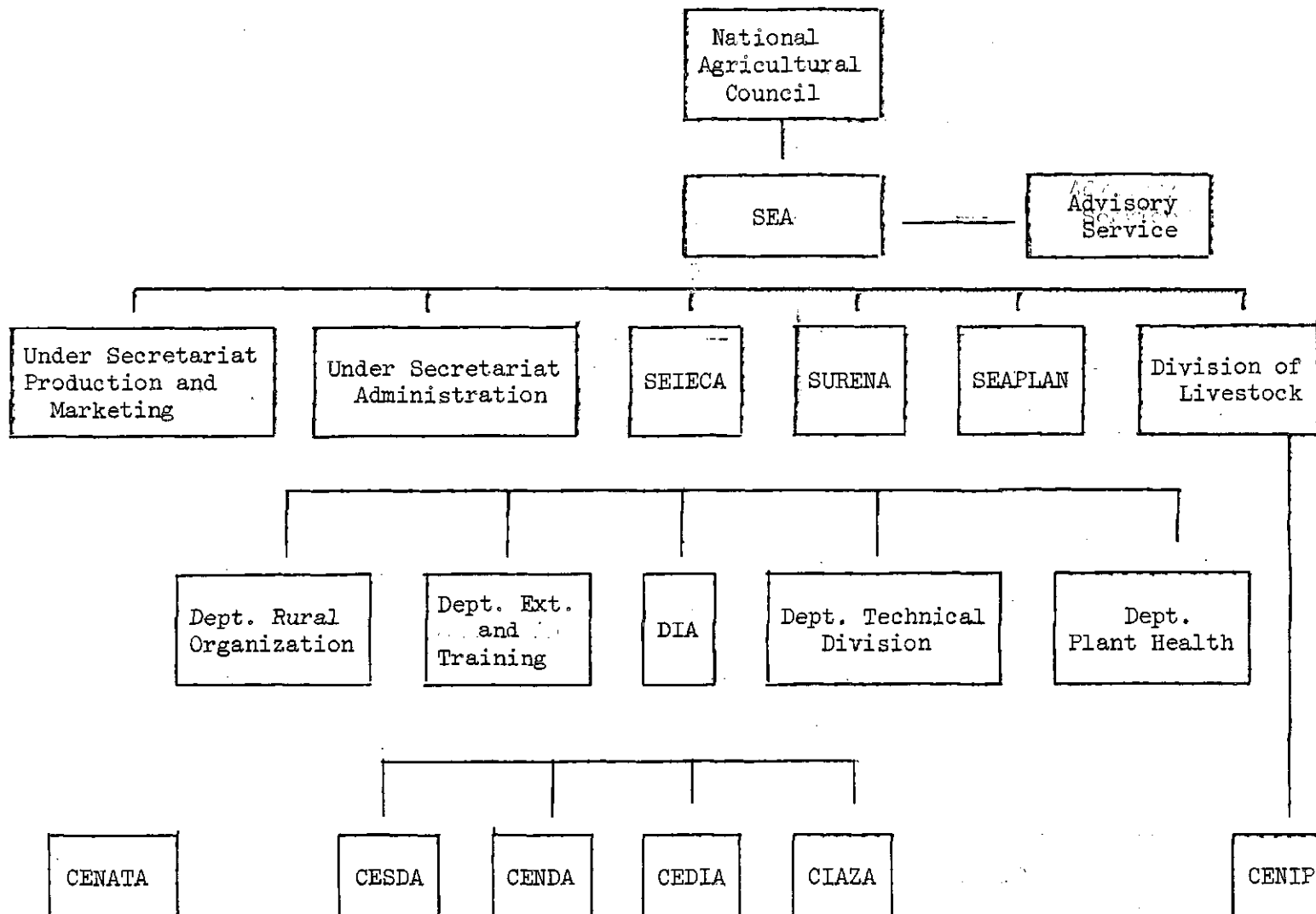


Table 2. Summary of available resources of the Department of Agricultural Research - by Centre and Experimental Station

	Experi- mental Area	Crops being researched	Location	*Physical Facilities Land Equipment
CENDA (Regional)	-	Laboratory direction administration and support	La Herradura Santiago	R G G
Exp. ) Station) Constanza	30	Wheat, bean, potato, garlic onion	Constanza La Vega	G R D
" " Boca de Mao	9.4	Tomato, onion, cotton, plantain, bean	Mao	G D D
" " Costa Atlántica	1.6	Corn, cassava, plantain, sorghum	Luperón	G G R
" " La Cumbre	3.0	Coffee	La Cumbre Santiago	G G R
" " Quinigua	2.0	Tobacco, bean, cassava, sweet potato, plantain, papaya	Santiago	R R
CESDA (Regional)	50.0	Laboratory direction, administration and support, pigeon peas, tomato, onion, garlic, cassava, sweet potato, yam, musaceous	San Cristóbal	G G G
Exp. ) Station) El Escondido	10.0	Haricot, pigeon peas, tomato, plantain	Baní Peravia	R D D
" " Palo Alto	12.6	Haricot, pigeon peas, corn, sorghum, cassava, musaceous	Barahona	R D D
" " Arroyo Loro	15.7	Haricot, rice, corn, sweet potato, tannia, peanut, sorghum	San Juan de la Maguana	G G R
" " Baiga	2.0	Sweet potato, cassava, tannia, peanut, corn, bean	Higüey	R D D
CIAZA (Regional)	83.0	Direction, administra- tion. Tomato, corn, plantain, sorghum, pigeon peas, peanuts, haricot, garlic, melon, cotton, yam, irriga- tion, salinity	Ysaura-Azuá	G D D

Table 2 cont'd

	Experi- mental Area	Crops being researched	Location	*Physical Facilities		
				Land	Equipment	
CEDIA (National)		Rice	Juma Bonao	G	D	D
Exp. ) EL Station) Pozo	12.0	Rice	Nagua	G	G	G
" " Laguna Salada	6.3	Rice	Valverde	R	D	D
" " Rancho Arriba	1.0	Rice	Bonao	R	D	D
CENIP (National)	125.6	Direction, administra- tion, facilities, pastures and cattle	Kilo- metre 23, D.N.	G	G	G
Exp. ) Casa de Station) Alto	4.0	Pastures and cattle (Holstein, Brown, Swiss)	San Francisco de Macorís	G	R	R
" " Higüey	2.3	Pastures and cattle (Brahman, Charolais)	Higüey	G	R	D
Exp. Sub- ) Station ) Magarin	27.0	Pastures and cattle (Romana Red, Zebu)	km 8, Hato Mayor	G	R	D
Centre Las Tablas	6.3	Pastures and goats (Alpine, Nubian, Creole)	Las Tablas, Baní	G	R	D

\* G = Good

R = Regular

D = Deficient