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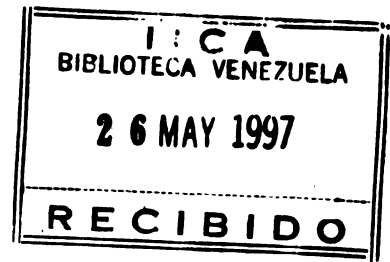
AGRICULTURAL TECHNOLOGY DEVELOPMENT AND TRANSFER

IN ST KITTS AND NEVIS

IICA OFFICE IN ST LUCIA

July 1991

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AGRICULTURAL TECHNOLOGY DEVELOPMENT AND TRANSFER

IN ST KITTS AND NEVIS

By

✓
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Regional Specialist in
Technology Generation and Transfer

IICA OFFICE IN ST LUCIA

July 1991

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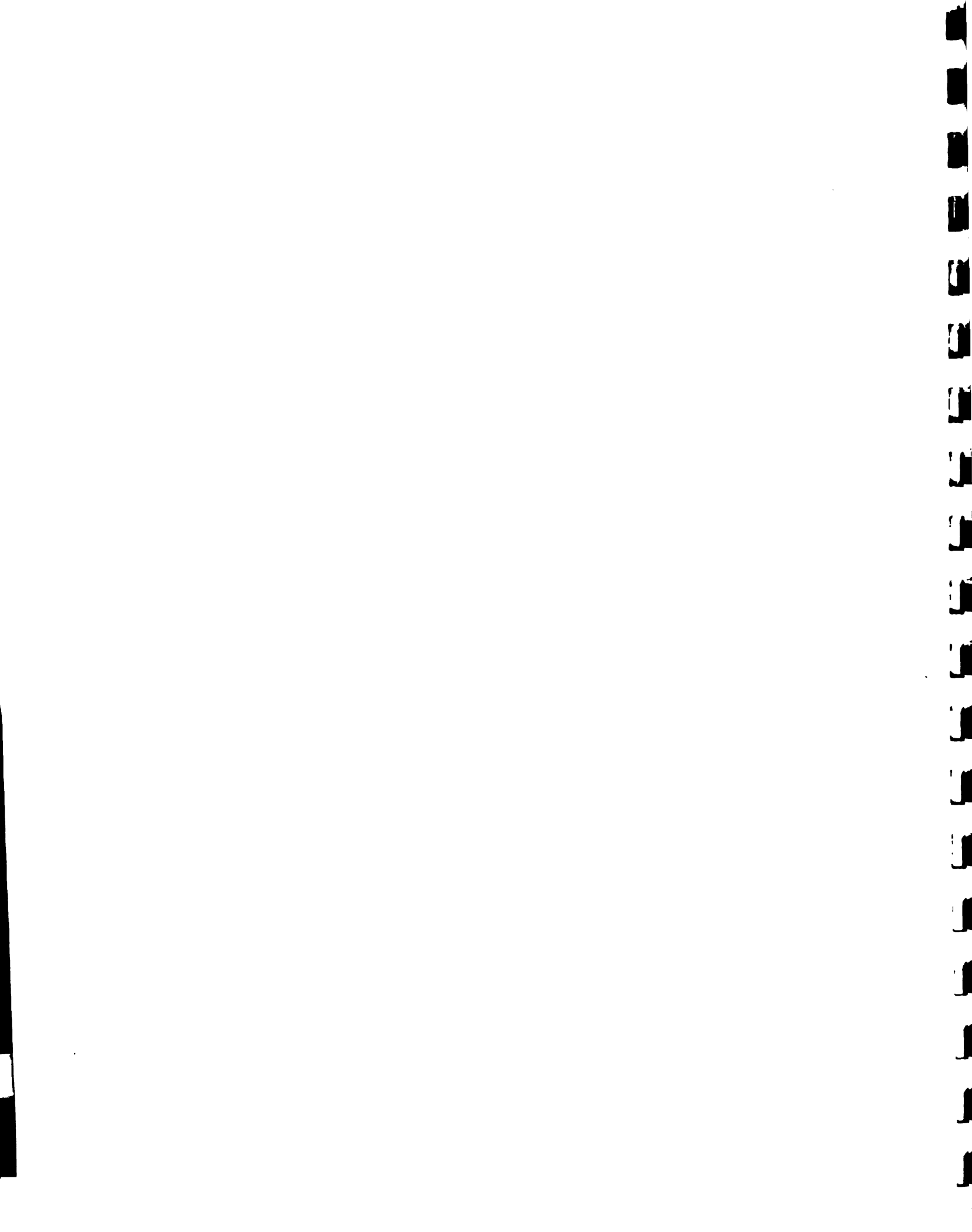
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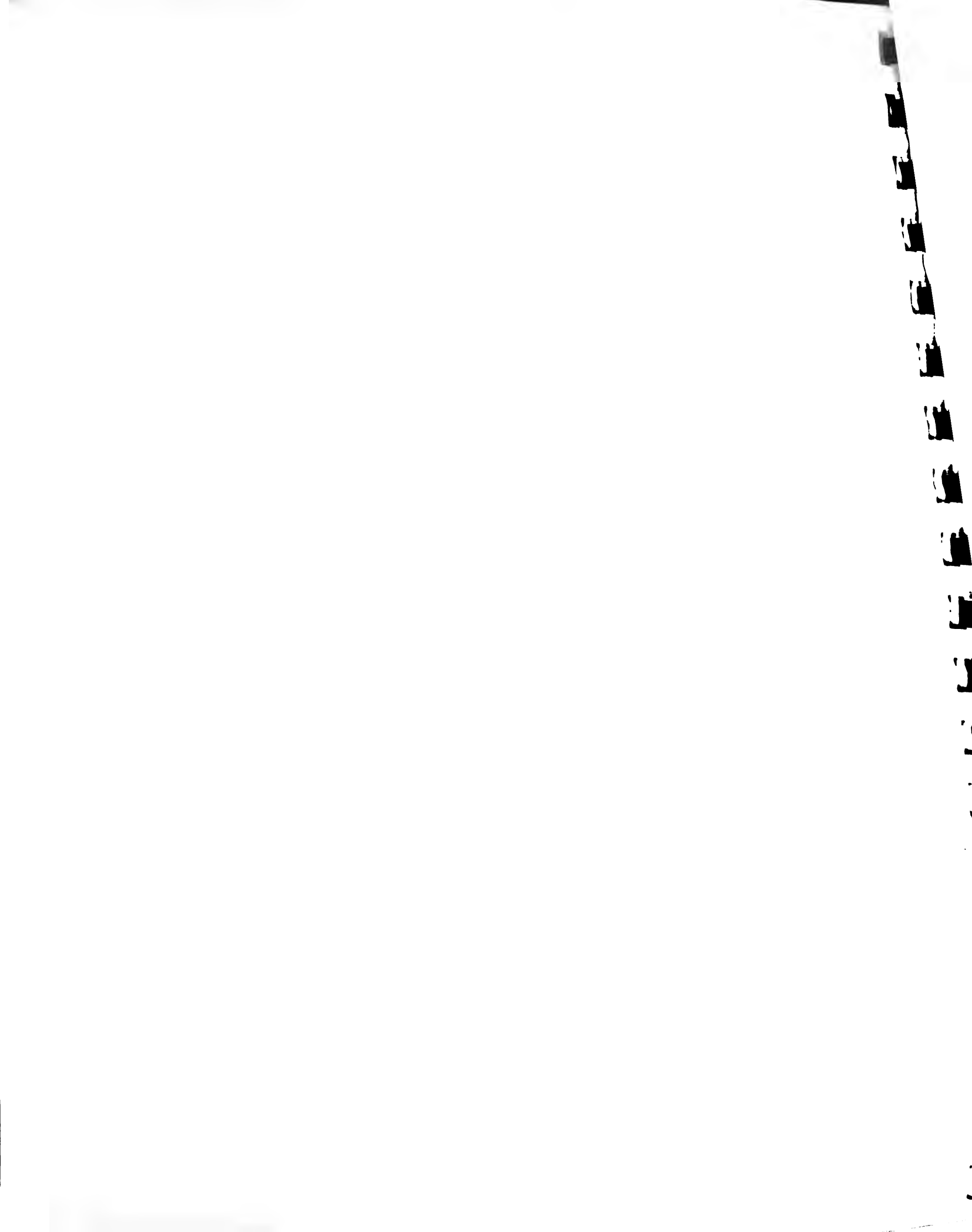
ACRONYMS AND ABBREVIATIONS

ADCU	Agricultural Diversification Coordinating Unit
AED	Agricultural Extension Division
ARD	Agronomy and Research Department
BDD	British Development Division
BSc	Bachelor of Science
CARDATS	Caribbean Agricultural Rural Development Advisory and Training Services
CARDI	Caribbean Agricultural Research and Development Institute
CDB	Caribbean Development Bank
CEMACO	Central Marketing Corporation
CFTC	Caribbean Fund for Technical Cooperation
CATIE	Tropical Agriculture Research and Training Center
CIAT	International Center for Tropical Agriculture
CIDA	Canadian International Development Agency
CIRAD	Center for International Cooperation in Agricultural Research for Development
CIP	International Potato Center (Peru)
CIMMYT	International Maize and Wheat Improvement Center (Mexico)
CRD	Crop Research Division
DBKN	Development Bank of St Kitts and Nevis
DIP	Diploma (in Agriculture or equivalent)
DOA	Department of Agriculture
EDF	European Development Fund
FAO	United Nations Food and Agricultural Organization
FND	Foundation for National Development
HCO	Horsfords & Co. Ltd.
IICA	Inter-American Institute for Cooperation on Agriculture
INRA-AG	National Agronomic Research Institute -Antilles/Guyane French
ISNAR	International Service for National Agricultural Research
IPCU	Integrated Pest Control Unit
MOA	Ministry of Agriculture
MSc	Master of Science
OAS	Organization of American States
OECS	Organization of Eastern Caribbean States
PAT	Project Advisory Team
PhD	Philosophy Doctor
ROC	Republic of China
SSMC	St Kitts Sugar Manufacturing Corporation
TDC	Trading and Development Corporation
TDT	Technology Development and Transfer
TDTS	Technology Development and Transfer System
TGT	Technology Generation and Transfer
TOP	Team of Operations and Planning
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
UWI	University of the West Indies



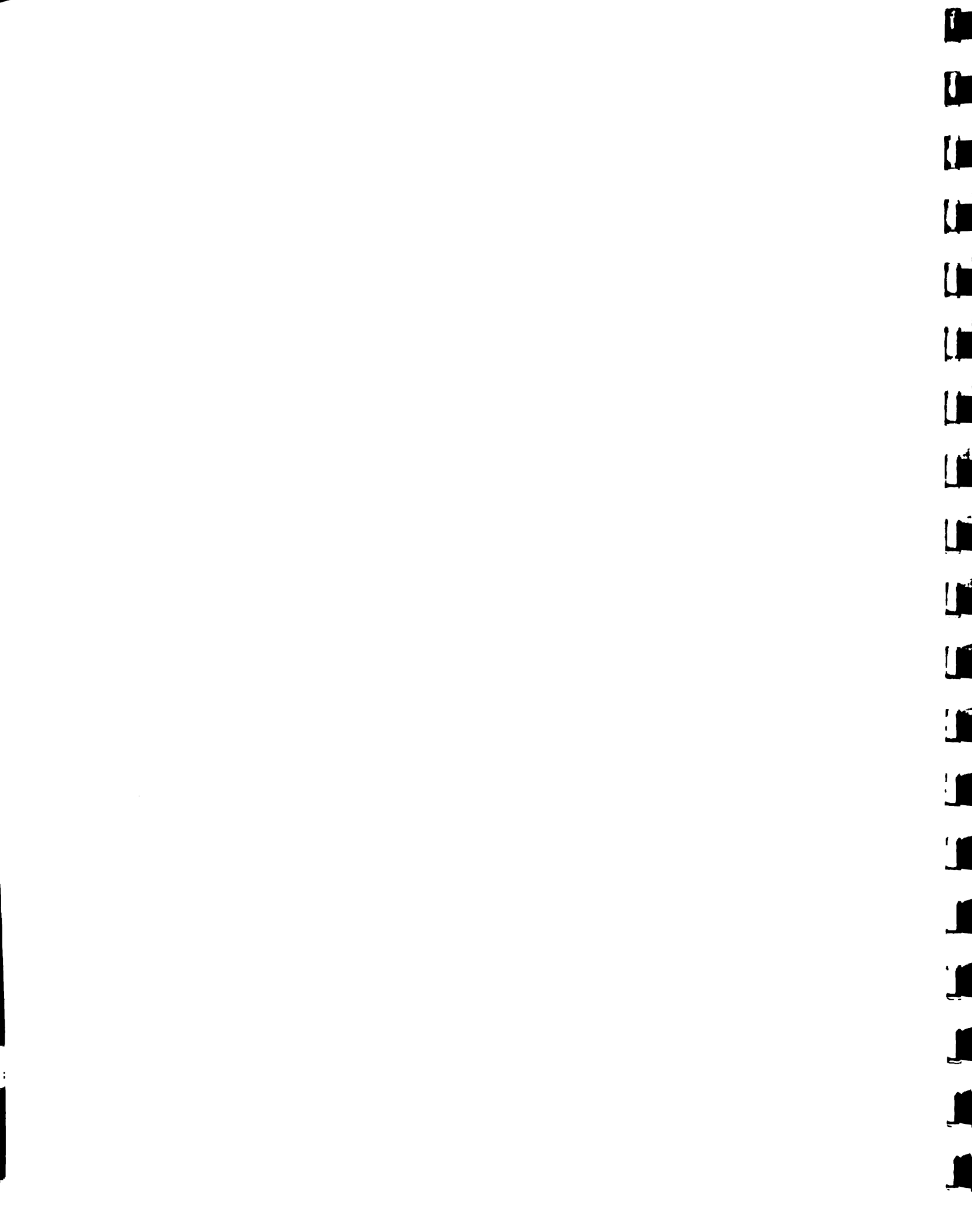
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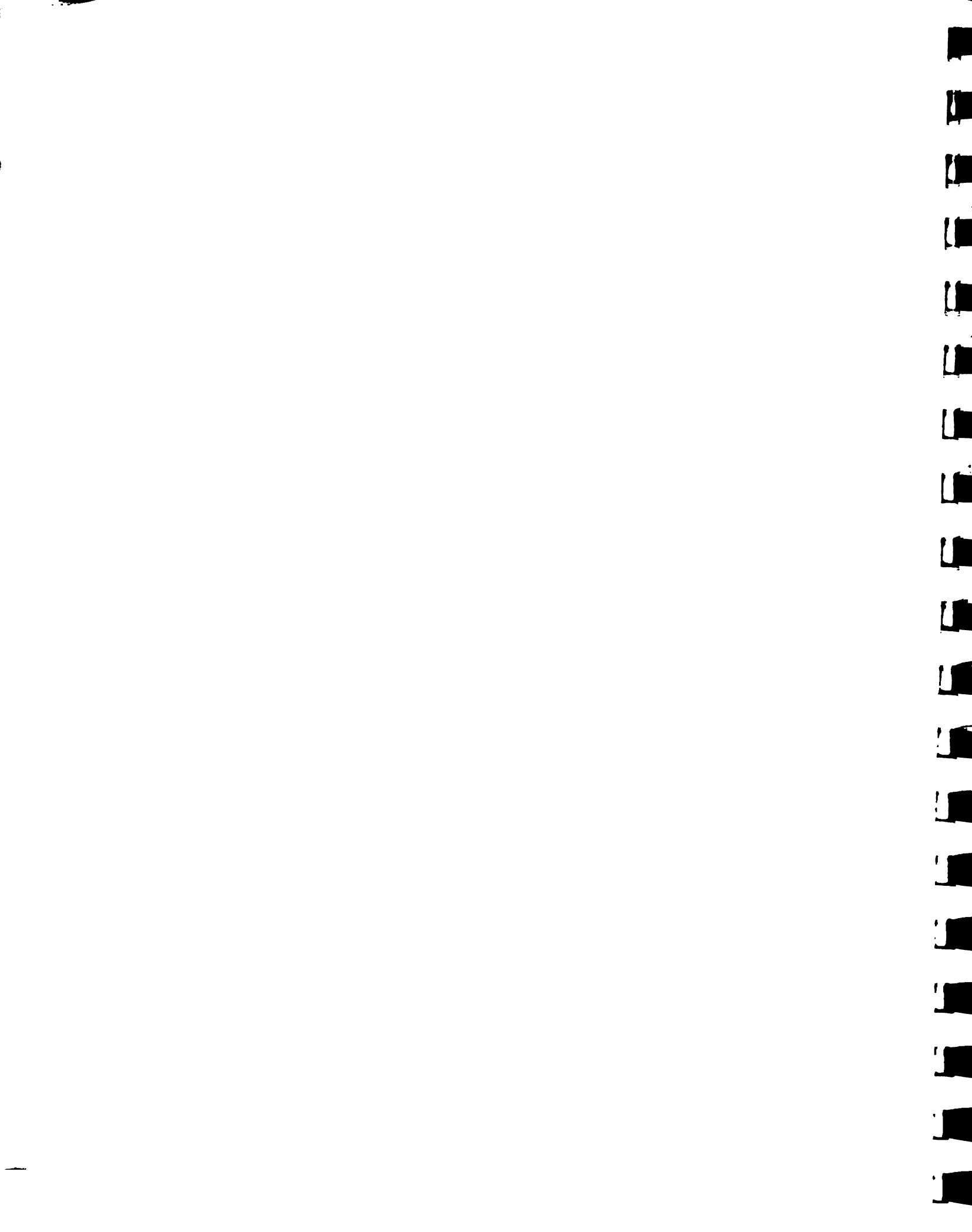
EXECUTIVE SUMMARY

The Federation of St Kitts and Nevis is bent on developing agriculture to boost its economy. This goal presents a stimulating challenge to the institutional technology development and transfer system for modernizing the sector and spurring its diversification. The TDTS must aim particularly at increasing productivity to compensate for the smallness of the land area while improving efficiency in the use of water to compensate for the dryness of the climate.

Enlightened technology policy, streamlined functional organization of the structures dealing with technology development and transfer and upgraded managerial capability of the relevant professionals, especially in research/development and extension, must be key objectives of the Department of Agriculture as core TDTS institution in each island.

Stronger operational linkages among production/processing technologists, marketing specialists and farmer organizations must guide the overall strategy to increase the efficacy and efficiency of the TDT (encompassing research and generation/acquisition, testing/adaptation and validation and transfer of technologies) for sustainable agricultural development in the Federation.

To meet the challenge, institutional commitment at all levels of the TDTS must be promoted and supported by both the public and private sectors.



1. INTRODUCTION

The national institutional structure for agricultural technology development and transfer was reviewed in the UNDP/FAO/CDB study for agricultural diversification in St Kitts and Nevis (Nurse et al, 1988). The interviews carried out and observations recorded for this present assessment by IICA tend to coincide with its findings, more than three years ago. Very little institutional change has been introduced since then into the setting of policy, organization and managerial mode of the TDT structure (encompassing research and generation/acquisition, testing/adaptation and validation of technologies) as well as the transfer of valid technologies to farmers in either state, excluding movement of professional staff.

Here, an analysis of the relevant institutions comprising the structure conceived as a system and recommendations to increase its efficacy and efficiency are emphasized. In doing so, previous conclusions and recommendations known by this mission are duly considered.

As the institutional composition of the local Agricultural Technology Development and Transfer System differs between the two islands, these will be treated separately for practical purposes. In this assessment, technology development means the process of making practical technologies available to farming as a result of research and generation/acquisition, testing/adaptation and validation of technologies for the intended users. Technology transfer then is the process of assisting farmers in actually getting and using the new technologies in their farming systems.

2. TECHNOLOGY DEVELOPMENT AND TRANSFER STRUCTURE

2.1 ST KITTS

2.1.1 Public Sector Institutions

2.1.1.1 The Department of Agriculture

The DOA is the lead institution for agricultural development in St Kitts. This role is discharged through its seven divisions, placed under the Director of Agriculture. It is headed by a Livestock Production Specialist at the PhD level. Excluding provision of general support services to farmers and routine extension activities of the Fisheries Division, only its Crop Research Agricultural Extension Veterinary Services and Livestock Divisions are effectively engaged in technology development and transfer for crop and livestock development.



As in most other DOAs in the Organization of Eastern Caribbean States, the number of professional staff in all three Divisions is extremely small. For meaningful technology-led research (Nickel, 1989), the number of qualified personnel is insufficient.

The Crop Research Division is headed by a Crop Research Officer with a Master of Science degree in Agronomy, who supervises two full-time Agricultural Assistants, holding at most a Diploma in Agriculture. A part-time graduate, with a Bachelor of Science degree complements the CRD professional team.

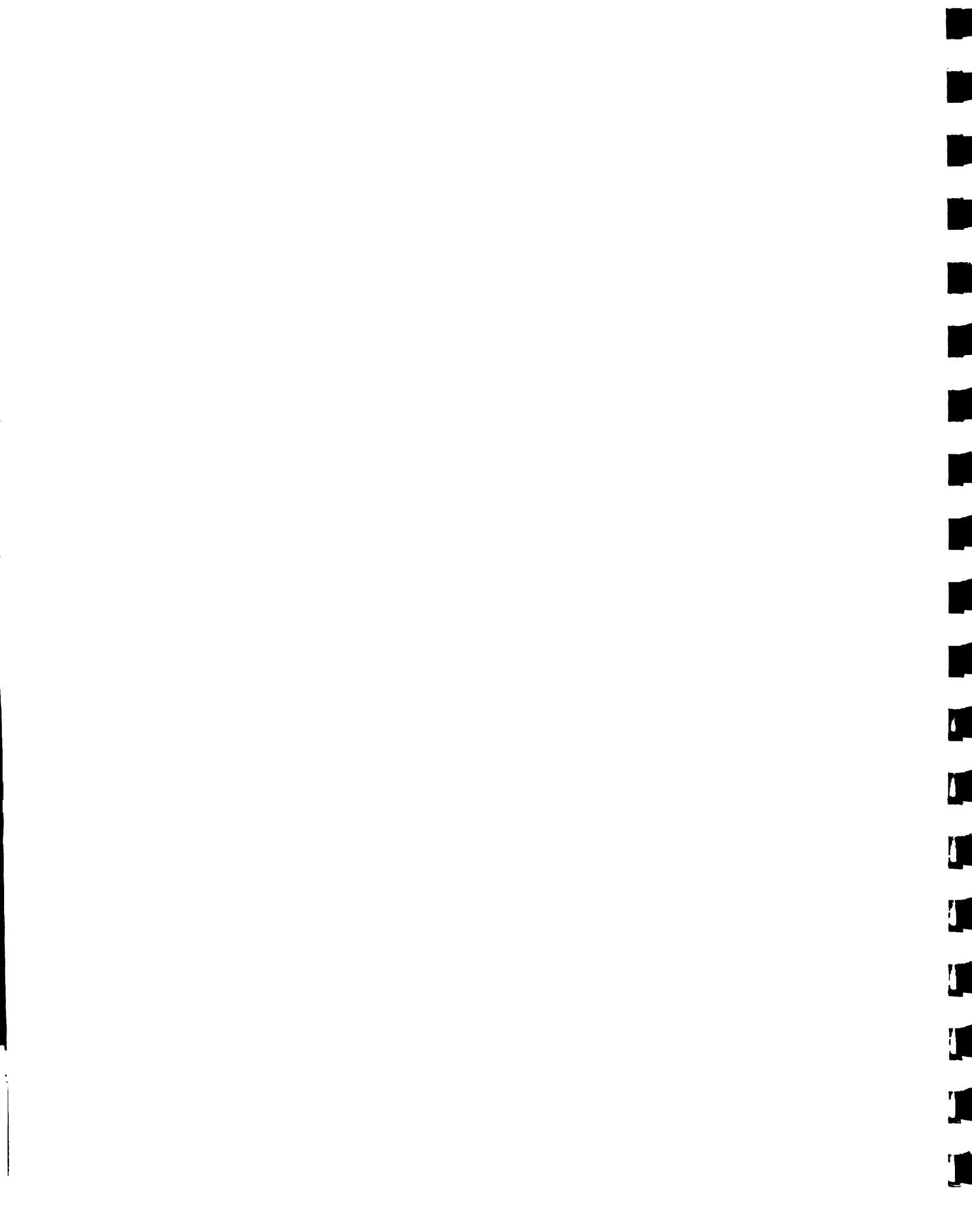
The Veterinary Services and Livestock Division is headed by a Veterinarian and depends on a sole professional, the Livestock Officer (with a MSc degree in Animal Science) to develop modern technology for livestock production. The remaining staff (one Animal Health Officer at the BSc level and four Animal Health Assistants at Dip level) look after animal health services to livestock farmers.

The Extension Division is headed by a Chief Extension Officer with a BSc degree in Agriculture, assisted by five undergraduate (Dip) Extension Officers. It transfers crop and livestock production technologies to farmers in the state's six Extension Districts.

To facilitate the adoption of technologies, the DOA provides several general support services to farmers through the following Divisions:

- 1) Extension (planting materials and other inputs, infrastructures)
- 2) Veterinary Services/Livestock (medicines)
- 3) Agricultural Engineering (equipment for land preparation and irrigation)
- 4) Forestry (zoning)
- 5) Fisheries (materials, equipment)
- 6) Cooperatives (registration)

Considering the diversity of technological needs for agricultural diversification and subtracting professional time spent on administrative or otherwise non-technical duties, the human resource base for technology development and transfer in the DOA is clearly overstretched. To compound this constraint, precious work time is diverted by the professional staff to ad-hoc non-programmed training, meetings and other non-essential activities. Deepening or spreading dissatisfaction was also



expressed by key DOA professional staff, especially at the middle management level, about their work environment.

Yet the DOA has contributed significantly to technological modernization of agriculture in St Kitts. Its annual reports since 1986 were not available for this Assessment Mission but the observed results of its TDT activities in vegetable (especially white potato) production have been highly successful. Performance in livestock development is less impressive, due in great measure to the widespread incidence of the tick-borne disease dermatophilosis that decimated the livestock population during the 1980's.

2.1.1.2 The St Kitts Sugar Manufacturing Corporation

The SSMC, a parastatal enterprise primarily develops and transfers technologies to support its own sugar cane production and transformation venture. It has shown less than enthusiastic interest about getting into non-sugar based agriculture (Nurse et al, 1989). But considering that it controls most of the arable land in St Kitts, agricultural diversification as targeted in the MOA's stated policy (Nat. Dev. Plan St Kitts/Nevis, 1986-1990) cannot proceed effectively without its direct or indirect support.

The SSMC deals in TDT through its Agronomy and Research Department. It also runs jointly with CARDI, the Integrated Pest Control Unit, within the purview of ARD.

The Manager of this structure holds a MSc degree in Agronomy and is assisted by nine undergraduate professionals (mostly at the Dip level). CARDI assigns to IPCU one graduate (BSc degree) professional in Entomology, but she is due to leave SSMC soon. No replacement was identified by the Mission.

The ARD's performance has been positive on technical modernization of sugar cane development, although several external conditioning factors (such as low rainfall and equipment breakdown) have negatively impacted on cane and sugar yields lately. Performance in non-sugar commodities (peanut, yam, cabbage, white potato, sweet potato, pineapple, mango, citrus, coffee and others) has been less satisfactory, apparently due to insufficient support from SSMC's management.

2.1.1.3 Other Public Agencies

Several other public institutions or agencies operationally relate with the DOA. They include:

- 1) The Central Marketing Corporation, through purchase of agricultural products from farmers



- 2) The Foundation for National Development, by conceding loans to farming or agriculture-related ventures
- 3) The Development Bank of St Kitts and Nevis, by lending money to farming business and supporting financially some DOA's TDT activities.

2.1.2 Private Sector Institutions

2.1.2.1 The Trading and Development Corporation

The TDC sells agricultural inputs including agro-chemicals, equipment and small tools. Thereby it facilitates and influences the adoption of technologies by farmers. It has maintained functional and operational, albeit informal, linkages with the DOA's technology development and transfer set-up.

2.1.2.2 S L Horsfords & Co Ltd

S L Horsfords & Co Ltd plays a role similar to that of TDC to facilitate the adoption of technologies by farmers. Its functional and direct operational linkages with the DOA seem weaker than TDC's. Nevertheless it has contributed to technology modernization of the agricultural sector in St Kitts, through the sale of inputs and equipment.

2.1.3 Regional, Bilateral and International Institutions

2.1.3.1 The Caribbean Agricultural Research and Development Institute

CARDI for all practical purposes is the institutional arm of the DOA for applied Research. And due to the small professional staff size of the DOA's Crop Research Division, CARDI is also expected by the DOA to play a large role in technology generation and adaptation. Former activities undertaken by the now phased-out CARDATS in support of technology transfer, have been fused into CARDI.

But CARDI's own professional staff size in St Kitts is small relative to the assigned responsibility. A Livestock Specialist, (with a Msc degree in Animal Science), is its Administrative Representative in the Federation. In St Kitts he is assisted by one graduate (BSc degree) Agronomist and one undergraduate (Dip) Technician in Livestock. One graduate (BSc degree) Entomologist and one undergraduate (Dip) Assistant employed by CARDI are assigned to the IPCU. Both the graduate Agronomist and Entomologist will leave their posts by the middle of this year.

In spite of such staff constraints, valuable technological contributions have been made by CARDI to agricultural development



in St Kitts. They have resulted in significant progress especially regarding insect and disease control in vegetable and root crops and improvement of small livestock (sheep and goat) production management (through CARDATS).

2.1.3.2 The University of the West Indies

The University of the West Indies does not have resident TDT professional staff in St Kitts. However, through the USAID funded Agricultural Research and Extension Project, the UWI representative based in Antigua and Barbuda provides technical assistance to the DOA's Extension Division. The major contribution of AREP, as a follow-up to the former Caribbean Agricultural Extension Project, also run by UWI and funded by USAID, has been to induce more effective functional and operational linkages between the research/development (CRD, CARDI) and transfer (AED) structures in the TDTS.

2.1.3.3 The Agricultural Technical Mission of the Republic of China (Taiwan)

The ROC Mission has been providing technical and financial assistance to the DOA in technology development for vegetable production and training of professional staff in crop and livestock husbandry. Its current professional staff includes one retired professor in Entomology (with a PhD level degree) and three Assistants (at the Dip level). They presently concentrate their work mostly on vegetable and fruit tree crop production.

The ROC has significantly contributed to technological modernization of vegetable production in the State, as observed during field visits by this Assessment Mission.

2.1.3.4 Other External Technical or Financial Supporting Entities

The TDTS in St Kitts has benefitted from the technical or financial assistance provided by a large number of other external institutions or agencies, either directly or through intermediaries.

The ADCU's USAID-funded Tropical Produce Support Project has facilitated the participation of the DOA's research and extension staff in regional training activities. Through both the OECS Vegetable and Yam (Food Crop) Development Projects Networks, sponsored by ADCU, FMC and IICA, the TDTS in St Kitts has accessed technological information and materials from INRA-AG and IRAT/CIRAD, especially regarding new tomato varieties and yam cultivars tolerant to anthracnose.



The OAS has supported agro-forestry development through its Forestry Development and Resource Management Project. Directly or through UNDP-funded projects, FAO has technically supported the TDTs in various areas including nursery management and production technology for fruit tree crop development. Financial and technical support from BDD covers fruit tree crop production and animal health.

Other funding agencies including CIDA, EDF, CDB and CFTC have contributed one way or another to technology development and transfer in St Kitts. Just as this Assessment Mission was about to conclude, UNDP approved for funding an Agricultural Diversification Project for St Kitts and Nevis, to be administered by FAO, immediately.

2.2 NEVIS

The major institutions or agencies involved in agricultural technology development and transfer in Nevis are mostly the same as in St Kitts excepting SSMC, CEMACO, and HCO among the most important.

2.2.1 Public Sector Institutions

2.2.1.1 The Department of Agriculture

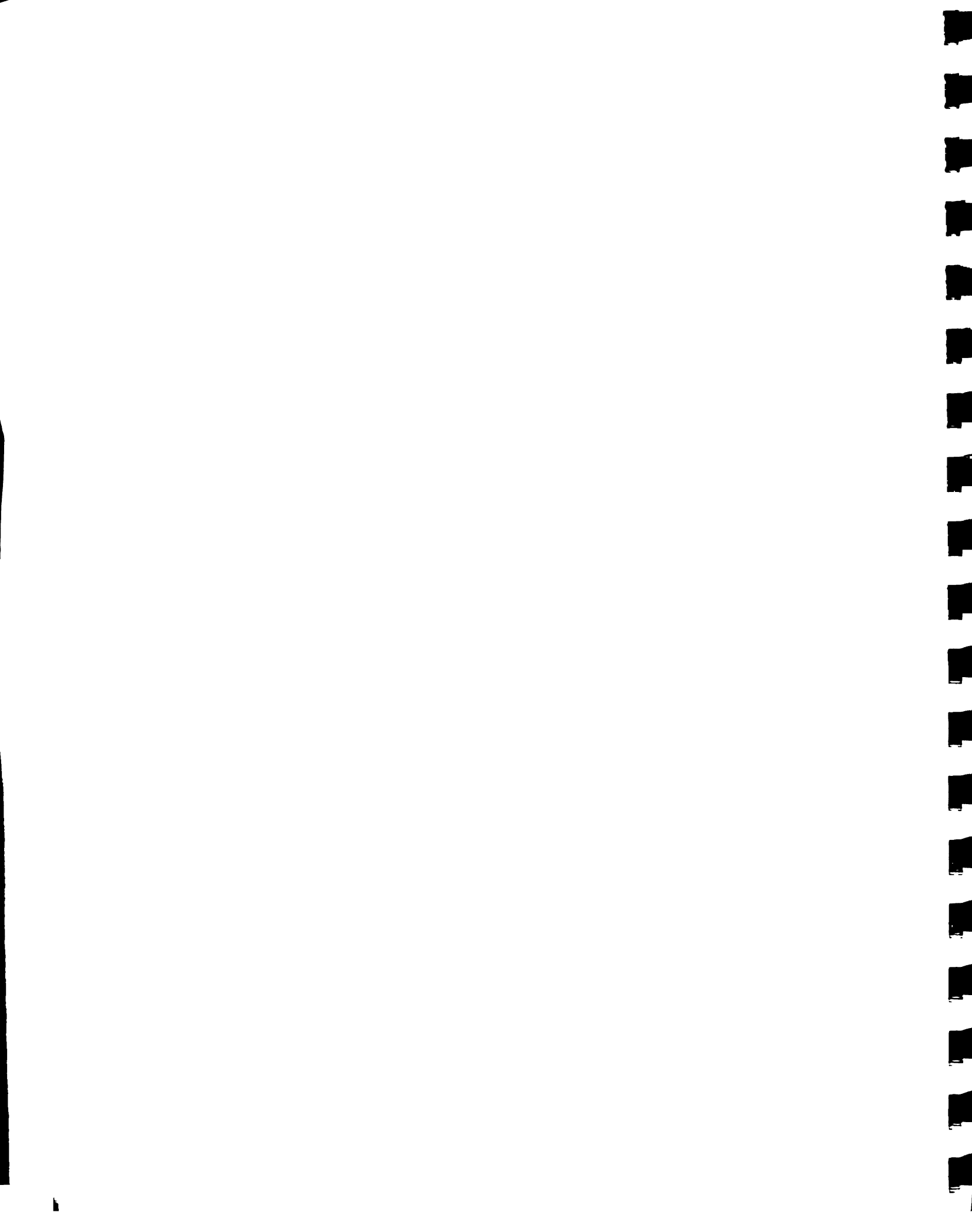
As in St Kitts, the DOA of Nevis is the core institution responsible for agricultural development in the State. It is headed by a graduate (MSc degree) professional in Agricultural Economics. Its TDT activities are carried out through a tangled structure comprising:

- 1) Crop Division, and
- 2) Animal Production Unit

The Crop Division groups two units:

- 1) Technology Development, and
- 2) Extension

This is one of the rare instances in the Caribbean where research/development of technology (R/D) and extension are structurally combined in a public sector institution.



The Crop Division is headed by an Agricultural Officer (with a BSc degree in Agronomy). He is assisted by four undergraduate (Dip) Extension Officers to cover the State's five Extension Districts. He also doubles as Research and Extension Officer.

The Animal Production Unit is headed by a graduate (MSc degree) in Tropical Veterinary Medicine and includes one (BSc degree) Livestock Officer, assisted by three undergraduate (Dip) Animal Production Extension Agents who also provide animal health services to livestock farmers.

The DOA provides general support services to facilitate adoption of technologies by farmers through the following sub-structures:

- 1) Extension Office (inputs, infrastructure, equipment)
- 2) Small Farm Equipment Pool (equipment for land preparation)
- 3) Cooperatives/Fisheries (and Apiary) Division (registration of cooperatives, equipment and materials for fishing and beekeeping)
- 4) Veterinary (Service) Unit (medicines)
- 5) Abattoir (slaughtering of animals, meat cutting)

Although small in size, the DOA professional staff have made significant technological contributions to agricultural development in Nevis. Especially, their work on vegetable (including white potato) and pineapple is worthy of praise (DOA/Nevis, 1990). Livestock development is, as in St Kitts, beset by the tick-borne dermatophilosis disease, but is recuperating as a result of BDD's successful technical assistance in amblyomma tick management.

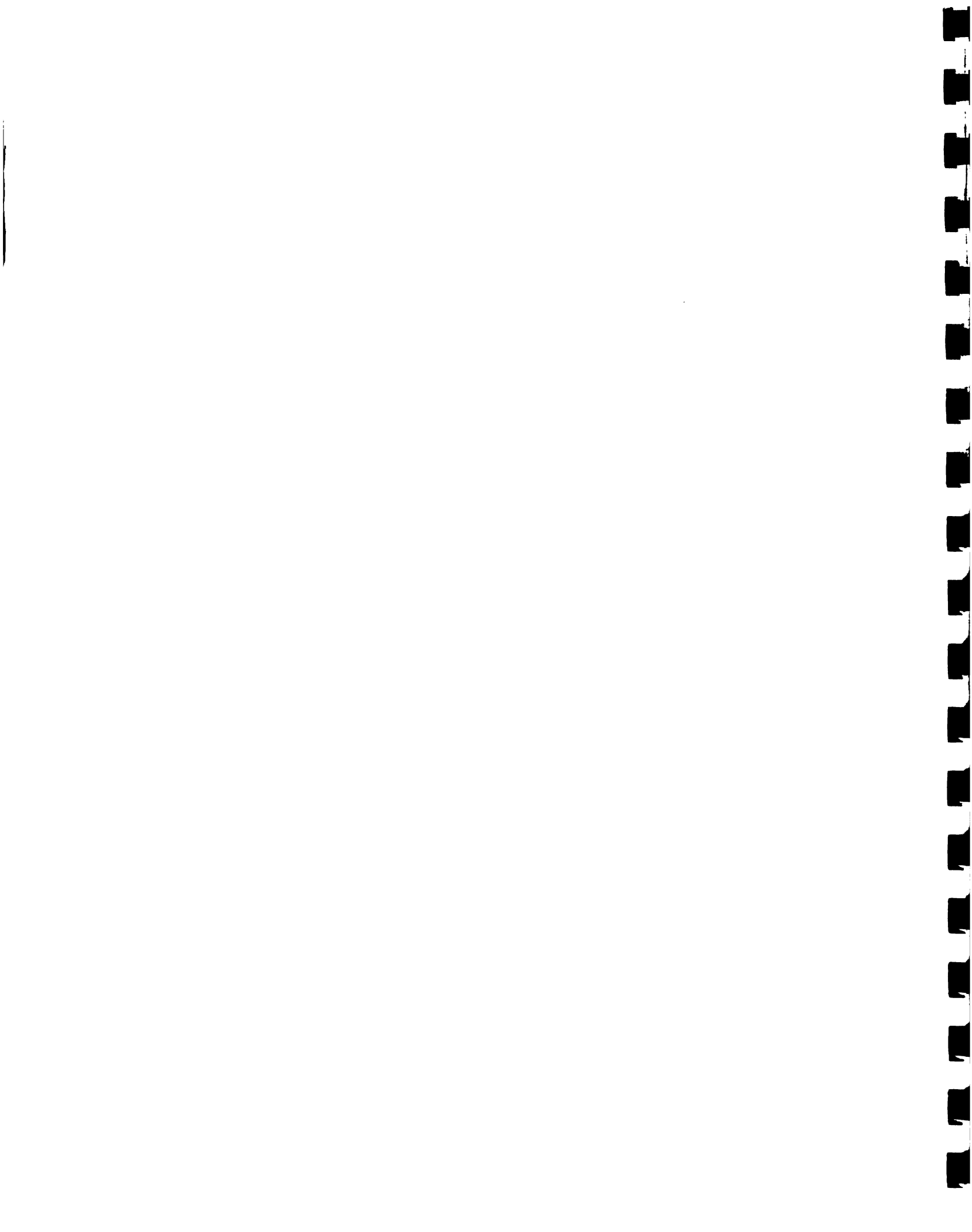
2.2.1.2 Other Public Agencies

As in St Kitts, FND and DBKN financially support TDT in Nevis, through their loans to farmers and operational linkages with the DOA.

2.2.2 Private Sector Institutions

2.2.2.1 The Trading and Development Corporation

The TDC in Nevis operates as in St Kitts. Its services have contributed to the adoption by farmers of new technologies, such as the use of drip irrigation for vegetable production.



2.2.3 Regional, Bilateral and International Institutions

The same external regional, bilateral and international institutions or agencies identified for St Kitts support technological modernization of agricultural development in Nevis.

CARDI has only one professional in Nevis. He holds a MSc degree in Nematology and works closely with the DOA's TDT set-up. He assists the Crop Division in all its technology development and transfer activities and provides technical support to livestock production management.

The ROC Mission has no resident staff in Nevis but provides training and other forms of technical assistance to TDT professionals in the State.

3 BASIC INSTITUTIONAL CONSTRAINTS

The institutional weaknesses in technology development and transfer identified by the UNDP/FAO/CDB study (Nurse et al, 1988) have not subdued. Together with those observed during this Assessment Mission, they can be grouped into four basic constraint areas in St Kitts and Nevis separately.

3.1 St Kitts

3.1.1 Policy-Making

Being the core institution in the local TDTS, the DOA needs to guide the availability and transfer of valid technologies consonant with the national policy for agricultural development and diversification. Although implicit or diffused throughout different documents produced by or related to the MOA, no technology policy seems to have been clearly stated, logically articulated and officially established by the DOA. No documented TGT plan and programme could be found either.

3.1.2 Functional Organization of TDT

For effective and efficient TGT action, the basic functions of the DOA can be divided into three broad groups:

- 1) Developing for and transferring to targeted farmers valid modern technologies
- 2) Providing general support services to facilitate adoption by farmers of recommended technologies, and



- 3) Monitoring and enforcing technical regulations to ensure agro-ecological and socio-economic sustainability of agriculture in the State.

As the DOA seems to have chosen to operate on a commodity mode, those functions should go horizontally across commodity groups (crops/livestock). Its current structural organization spreads all of its seven divisions in no apparent hierarchical order, hampering streamlined TGT planning and operational processes.

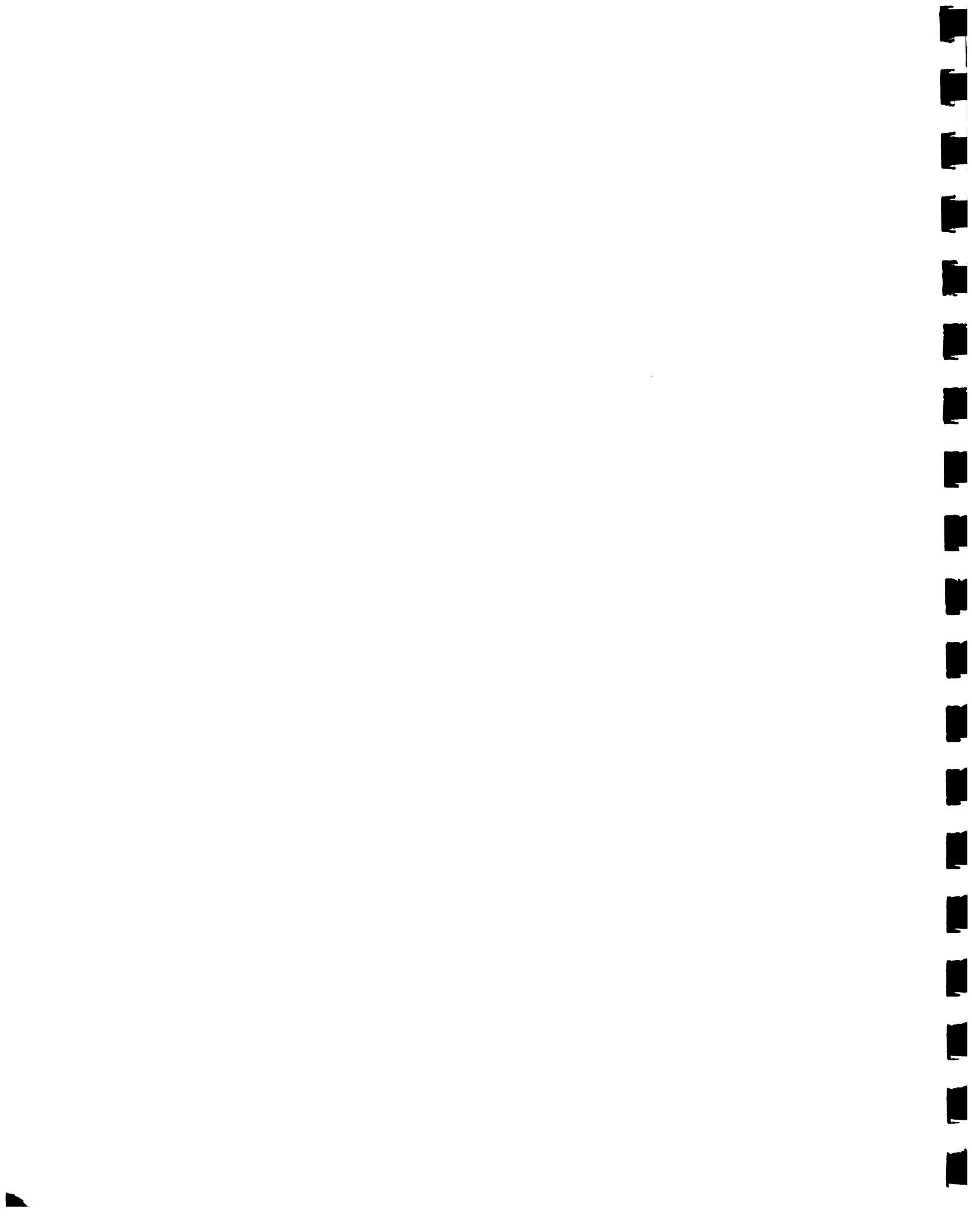
The functional and operational linkages between the DOA and the external cooperating institutions (principally SSMC/ARD, CARDI, ROC) although considered satisfactory by the parties concerned, have not been formally established at the necessary institutional level, leaving room for frequent disruptions. Also, horizontal or vertical cooperation with Research/Development (R/D) institutions based outside the OECS region (CATIE, CIAT, CIP, CIMMYT, ISHAR) is not clearly organized and firmly established in the DOA's structure.

3.1.3 Management of TDT

The managerial short-comings which surfaced in previous assessments of the DOA and this one are common to many similar organizations in the OECS. Usually TDT Managers have not gone through the necessary training in Business Management in general and TDT management in particular. But even when they would have, administrative peculiarities of the Civil Servant System leave little room for free-hand management, which should be stress results (achieved objectives) rather than amount of activities/tasks carried out.

The DOA's major managerial constraints include:

- 1) Insufficient participation of relevant professional staff in management and decision-making processes which directly affect their assigned responsibilities
- 2) Insufficient frequency of business meetings to guide, harmonize, coordinate, and support TDT actions at different structural and functional levels
- 3) Absence of a formal communication process and hierarchical channels (to make-up a dynamic reporting system) for supervision, monitoring and evaluation of TDT action and performance
- 4) Mostly re-active rather than pro-active (planned and programmed) training of professional staff



These and several operational constraints, such as insufficient transport and office/field facilities, tend to lead not only to reduced institutional performance but worse, to accelerated degradation of staff morale, motivation, ethics and institutional allegiance.

3.1.4 Project Identification and Preparation

The identification and preparation of well conceived projects must respond to expressed farmer's needs and allow for greater efficacy and efficiency in the use of scarce physical, financial and human resources.

However, the TGT tasks undertaken by the DOA, funded through the national budget, are not arranged into defined projects which would establish specific objective, measurable outputs, operational strategy, basic activities and required human, physical and financial resources (inputs).

Moreover, the current Planning structure in the MOA seems to deal only with projects which are externally funded, since apparently its major objective is to monitor cash flow and financial status of these.

3.2 NEVIS

3.2.1 Policy-Making

As in St Kitts, a sound policy statement on TGT has not been officially established by the DOA of Nevis for agricultural development and modernization in the State. No documented TGT Plan and Programme have been prepared either.

3.2.2 Functional Organization of TDT

The structural organization of the DOA in Nevis seems amorphous and tangled. Technical Units (e.g Animal Production) are placed at the same hierarchical level as Technical Divisions (Crop), Infrastructure (Abattoir) and Administrative Office (Executive Officer). All seven operational sub-structures in the DOA report independently to the Director of Agriculture, rendering streamlined TGT planning and operational processes difficult. External linkages for cooperation in TGT are not functionally structured, as in St Kitts.



3.2.3 Management of TDT

Fewer TGT management constraints were observed in Nevis than in St Kitts. But the absence of an established reporting system and reactive professional training are common to the DOA in both States.

3.2.4 Project Identification and Preparation

The constraints observed in Nevis are quite similar to those found in St Kitts in TGT projecting. Although the activities conducted by the TDT staff of the DOA in Nevis have achieved remarkable results in boosting production of some commodities, they have not been organized into defined projects. The absence of logical frameworks hampers effective monitoring and objective evaluation of the DOA's TGT performance.

4 GENERAL RECOMMENDATIONS FOR ST KITTS AND NEVIS

To boost its impact on sustainable agricultural development, diversification and modernization in the Federation, the DOA should effectively guide the technology development and transfer system in each State. Taking into account the current sector policy, as set out in the most recent national development plans (St Kitts and Nevis, 1986-1990; Nevis, 1987-1991) this institutional mission could be carried out within the framework of the following set of objectives, outputs, inputs and basic activities.

4.1 SECTOR OBJECTIVES

- 1) To achieve food self-reliance, through increased domestic production and consumption of targeted commodities in the plan
- 2) To increase foreign exchange earnings, through aggressive and competitive agricultural exports
- 3) To generate gainful employment, by attracting a new generation of entrepreneurial farmers as well as increasing job opportunities through agriculture-based or related secondary or tertiary activities (including agro-processing and tourism)
- 4) To ensure continued socio-economic growth, by sustaining contribution of agriculture to GDP and fiscal revenues, through sound management of the country's natural resources, especially lands and water.



4.2 OUTPUTS OF THE TDTS

- 1) Valid improved or innovative technologies transferred to and incorporated into target farming systems, through enlightenment and empowerment of farmers.
- 2) Relevant technologies produced by the TDTS, resulting from stronger operational linkages among research/development institutions, extension services, marketing agencies and farmers (especially organized farmer groups).
- 3) Organized and dynamic access of TDT professionals to modern scientific, technical and technological information and materials, through strengthened or broadened horizontal/vertical cooperation with relevant R/D institutions or agencies within and outside the OECS region.
- 4) Increased institutional capability of the DOA to identify, formulate, and implement core or externally funded TDT projects, through appropriate training of relevant personnel.

4.3 INPUTS - HUMAN, FINANCIAL AND PHYSICAL RESOURCES

4.3.1 National

4.3.1.1 Public sector (including non-profit autonomous entities)

4.3.1.2 Private sector (profit-led enterprises including farmer organizations)

4.3.2 Extra-national

4.3.2.1 Regional

4.3.2.2 Bilateral

4.3.2.3 International

4.4 BASIC ACTIVITIES

The DOA in each island should address urgently the setting of technology priorities (including biotechnology) functional re-organization of its TDT structures and external linkages, upgrading of the managerial capability of the relevant staff, and assembling of its TDT activities into well formulated projects within clearly established crop/livestock development programmes.



5 SPECIFIC PROPOSALS

As the agricultural setting and State policies differ between St Kitts and Nevis, specific proposals are developed separately for each. The specific aim is to achieve greater TDT efficacy and efficiency in agricultural development, diversification and modernization in the Federation.

5.1 ST KITTS

5.1.1 Technology Policy Setting

A one-day workshop involving policy-makers (Director of Agriculture, Director of Planning Unit, DOA Division/Unit Heads and relevant resource persons) should be called by the Permanent Secretary (PS) in the MOA to define a coherent and sound modern technology (including biotechnology) policy for sustained development, diversification and modernization of agriculture in the State. The resulting draft document should be submitted by the PS to the Hon. Minister of Agriculture for consideration, approval, and enactment as deemed appropriate.

At the discretion of the DOA the same group of participants in formulation of Technology Policy could be retained as a Team on Agricultural Technology for Crop/Livestock Development (TAT) or Team on Operations and Planning (TOP). Its role would be to review and identify policies, programmes and projects and to conduct internal programme/project monitoring and evaluation.

5.1.2 Functional Organization of TDTs

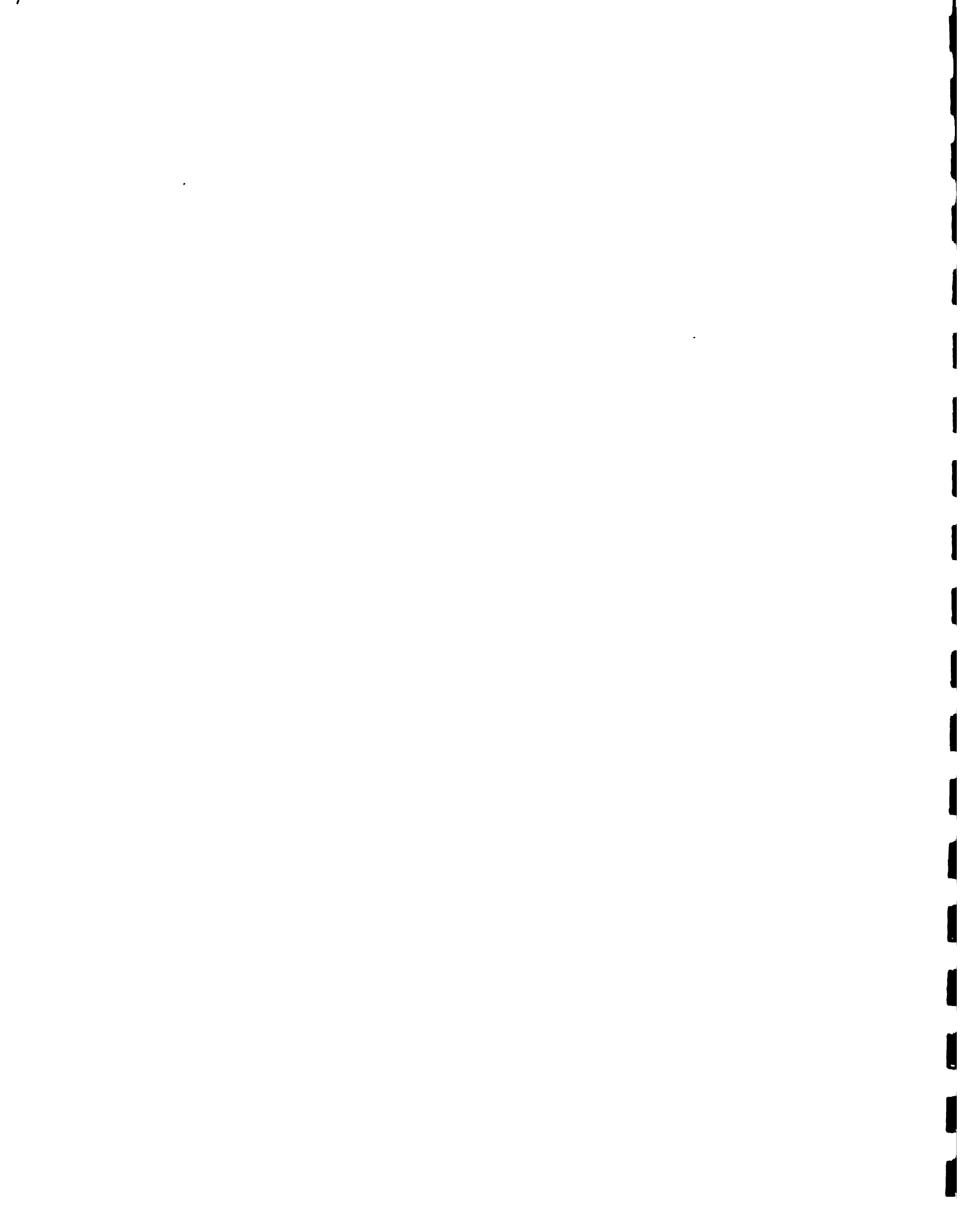
Increasing the professional staff, financial resources or physical facilities of the DOA alone may not improve its performance in TDT unless such measures are preceded by the rationalization of its functional organization. This can be achieved with the structures already in place as long as they could be re-arranged to work as a system with a clearly defined set of programmes and projects guided by the Agricultural Sector Development Plan.

The most urgent organizational changes which could increase efficacy and efficiency of the DOA's TDT action are:

- 1) establishment and institutionalization of a planning process which could
 - facilitate technology development and transfer planning
 - assist in data collection and retrieval
 - assist in project identification and formulation

D

- conduct formal project monitoring and evaluation
- 2) transformation of the Veterinary Services and Livestock Division to LIVESTOCK DIVISION, with an Animal Production Unit and an Animal Health Unit, under the same Division Head
 - 3) formalization of functional and operational linkages between the DOA's Livestock Division, Crop Research Division (better renamed CROP DIVISION), Agricultural Extension Division; SSMC's Agronomy and Research Division (better renamed AGRICULTURAL RESEARCH/DEVELOPMENT Division); CARDI's Crop, Livestock and Technology Adaptation and Transfer Programmes; and ROC's Agricultural Technology Development Programme (including crop and livestock).
 - 4) specialization of the Agricultural Extension Division professional staff in crop or livestock production and protection/health, to focus technology transfer and servicing.
 - 5) formalization of functional and operational linkages between AED and the DOA's Cooperatives Division, to assist and support farmers in forming and managing not only cooperatives but also other types of FARMER ORGANIZATIONS (association, company and others).
 - 6) establishment of formal functional complementarity and operational ties between the permanent R/D professional staff of the DOA and those of SSMC/ARD Division (under separate management within SSMC), CARDI and ROC, especially in plant pathology, entomology, soil/water management, economics, sociology, biometry and other disciplines in which the DOA is currently weak.
 - 7) revitalization of the National Agricultural Planning Committee (better renamed NATIONAL AGRICULTURAL ADVISORY COUNCIL), with a small number of working groups (committees), comprising principally the following:
 - Research/Extension (covering jointly crops and livestock)
 - Marketing
 - Finance
 - Natural Resource Management
 - 8) institutionalization of the proposed TOP under the leadership of the Director of Agriculture to identify, approve, review, monitor and evaluate technology development/transfer programmes and projects.

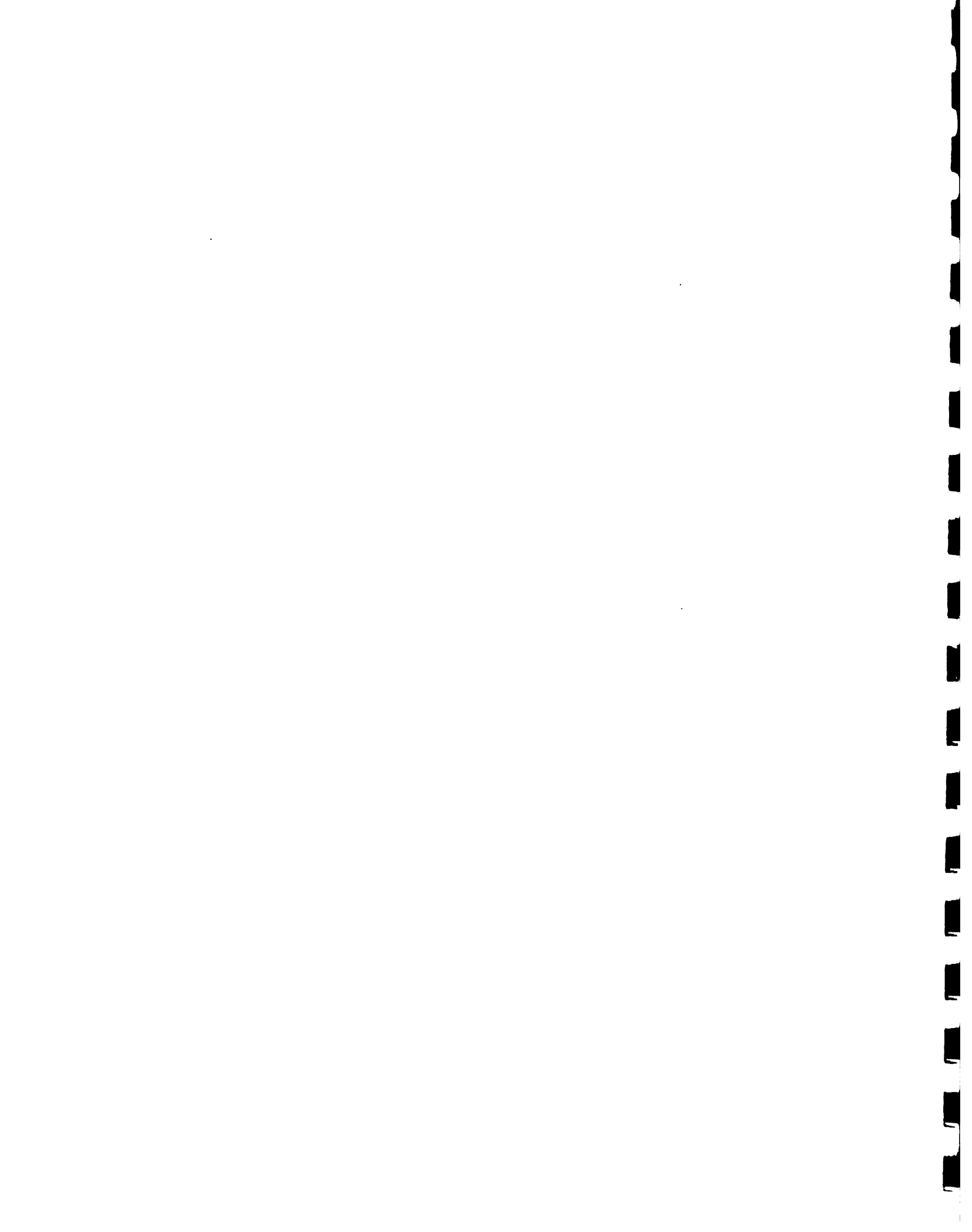


5.1.3 Management of TDT

- 1) the relevant staff in the DOA should be advised and trained in TDT management, through programmed seminars/workshops organized and conducted by the MOA in cooperation with specialized agencies (IICA, CARDI, CDB, UWI, CIDA and others), complementing previous training they may have received through the Caribbean Agricultural Middle-management Training Course.
- 2) the DOA should establish inter/multidisciplinary task forces or Project Advisory Teams (PATs) to assist Programme and project leaders technically in implementing the programme or projects placed by the Director of Agriculture under their responsibility and in accessing external (technical and financial) support.
- 3) the terms of reference of the DOA's Extension Division staff should be revised to reduce their responsibilities for activities which could be undertaken by other structures in or outside the MOA (e.g. provision of credit to farmers).
- 4) the DOA should endeavour to transfer gradually to the private sector, including farmer organizations, responsibility to provide general support services which they can better handle (e.g. sale of agro-chemicals and planting materials, land preparation, transport and marketing of produce and the like).

5.1.4 Project Identification and Formulation

- 1) the DOA should train its relevant staff in projecting (identification and formulation of technical and capital investment projects), co-opting the cooperation of regional and international organizations (e.g. CDB, CIDA, and others)
- 2) the DOA should group its current TDT activities into well defined and formulated projects within the established crop and livestock development programmes, consonant with the goals of the Agricultural Sector Plan
- 3) the DOA should direct its general support services to facilitate the adoption of valid technologies by targeted farmers in its TDT projects, once these are properly documented and filed with the Planning Unit for formal monitoring and evaluation



5.2 NEVIS

5.2.1 Technology Policy Setting

As in St. Kitts, a one-day workshop involving technology policy-makers (Director of Agriculture, Director of Planning Unit, DOA Division/Unit Heads and relevant resource persons) should be called by the Permanent Secretary in the MOA to define a coherent and sound modern technology (including biotechnology) policy for sustained development, diversification and modernization of agriculture in the State. The resulting draft document should be submitted by the PS to the Hon. Minister of Agriculture for consideration, approval and enactment as deemed appropriate.

At the discretion of the DOA the same group of participants in the formulation of Technology Policy could be retained as TAT or TOP. Its role would be to review and identify TDT policies, programmes and projects and to conduct internal programme/project, monitoring and evaluation.

5.2.2 Functional Organization of TDT

The functional organization of the DOA should be streamlined along hierarchical structures. The current Crop Division that combines under one Head the Technology Development Unit and the Agricultural Extension Unit could serve as a model to set up a LIVESTOCK DIVISION, combining under one Division head the current Animal Production and Health Units.

The new Livestock Division would also include livestock technology development as well as technology transfer professionals and veterinary service field agents, to parallel the Agricultural Extension Unit in the Crop Division. It should oversee the running of the abattoir.

The Small Farmer Equipment Pool could become a Service Unit within a new AGRICULTURAL ENGINEERING DIVISION, which would also deal with soil/water conservation and irrigation, transfer technologies and provide general engineering services. The Cotton Section should be placed within the Crop Division.

The Cooperatives/Fisheries (Apiary) Division could be split into separate Divisions or Units. The cooperatives structure should establish formal linkages with the AED to assist farmers in organizing themselves around crops, livestock, fisheries, beekeeping, and general support services (such as private nurseries) and servicing of small irrigation equipment.



Besides cooperatives other forms of farmer organizations should be promoted and supported by the DOA. Overtime, the SFEP should be handed over to a capable farmer organization.

The Executive Unit should be an administrative office annexed to the Office of the Director of Agriculture.

The Ministry of Agriculture of Nevis should establish a NAAC and dependent committees (Research/Extension, Marketing, Finance and Natural Resource Management), as proposed for St Kitts.

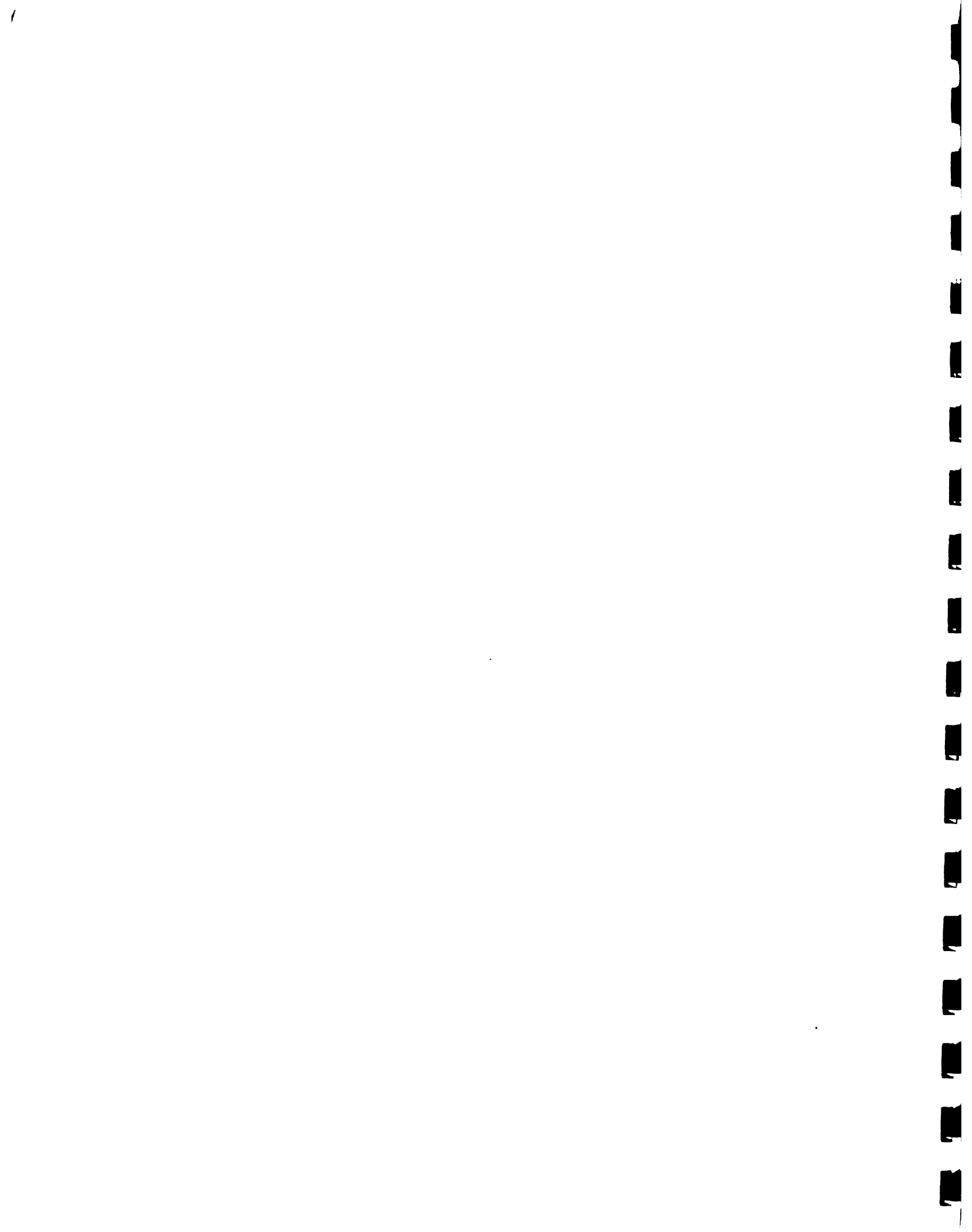
5.2.3 Management of TDT

As in the DOA of St Kitts, TDT management could be upgraded, through

- 1) training of relevant staff (in management principles and skills), conducted as seminar/workshops organized by the MOA of Nevis in cooperation with specialized external agencies (IICA, CDB, UWI, CIDA and others)
- 2) establishing PATs with similar role as in St Kitts
- 3) gradually transferring to the private sector (including farmer organizations) general support services which they could more effectively and efficiently deliver.

5.2.4 Project Identification and Formulation

- 1) the DOA should train its relevant staff in projecting (identification and formulation of core technical and capital investment projects), in cooperation with regional and international agencies (e.g. CDB, IICA, CIDA, CARDI and others)
- 2) it should group its current and future TDT activities into well defined and formulated projects within established crop and livestock development programmes, consonant with the Agricultural Sector Plan and filed with the Planning Unit for formal monitoring and evaluation.



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