

Malawi: Bunda Agricultural College



July 1987

Agency for International Development (A.I.D.)

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MALAWI: BUNDA AGRICULTURAL COLLEGE

A.I.D. PROJECT IMPACT EVALUATION REPORT NO. 64

by

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The views and interpretations expressed in this report are those of the authors and should not be attributed to the Agency for International Development.

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FOREWORD

The Center for Development Information and Evaluation (CDIE) of the Agency for International Development (A.I.D.) is responsible for A.I.D.'s project impact and program policy evaluations. The goal of the evaluation program is to inform the Agency's policymaking process and to improve project design, implementation, and evaluation. Through examinations of A.I.D. and other donor and recipient country experience and the preparation of special syntheses, CDIE provides a better understanding of the characteristics of development programs and lessons of what works and does not work in various settings.

The Bunda Agricultural College study, conducted in September 1985, is part of a larger series of studies on higher education in agriculture in Africa and other regions. The series is designed to enhance A.I.D.'s understanding of potentials for development and constraints on the past and future development of institutions of higher education in agriculture. A final evaluation report will summarize and analyze the results of all the studies on this topic and will relate them to program, policy, and design requirements.

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and Evaluation
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Agency for International Development
July 1987

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SUMMARY

When Malawi attained its independence in 1964, few of its citizens had any advanced training in the agricultural sciences, and most of the senior management positions in the Government and private sector were held by expatriates. Bunda Agricultural College was established within the University of Malawi in 1966 to address this manpower constraint. As the only agricultural college in Malawi granting diplomas and B.S. degrees, the College was intended to supply the trained agricultural manpower essential for Malawi's growing economy. To assist the College in this role, the Agency for International Development (A.I.D.) provided a US\$2.2 million grant from 1966 to 1970 and another US\$4.6 million grant from 1976 to 1982. Both grants were intended to finance construction of campus buildings, provision of long-term expatriate faculty, and training of Malawian faculty in U.S. universities.

Over the past 20 years, Bunda has operated at maximum enrollment capacity in meeting Malawi's manpower needs, and its accomplishments are amply evident in the agriculture sector. Since 1969, Bunda has granted 861 diploma degrees and 300 B.S. degrees, or approximately one-quarter of all degrees granted by the four constituent colleges of the University of Malawi.

Bunda's graduates have had no difficulty finding jobs consistent with their skill levels in the agriculture and education sectors. Nearly all of the middle- and senior-level managers, researchers, and extensionists in the Ministry of Agriculture and the Agricultural Development and Marketing Corporation (ADMARC), the primary agricultural marketing parastatal, are Bunda graduates. In the estate sector, both public and private, many of the middle- and senior-level managers and technicians are Bunda graduates. Finally, approximately 10 percent of all secondary school teachers are Bunda graduates. Indeed, in both the public and private agricultural sector, nearly all expatriates have now been replaced by Bunda graduates.

The relevance, quality, and efficiency of the educational program at Bunda remain high. The curriculum is designed to produce a trained agriculturalist with generalized skills rather than with specialized skills in a particular discipline. Interviews with Bunda graduates and with employers of Bunda graduates showed that most held highly positive views about the relevance and quality of the education program at Bunda. It was also the team's assessment that the goals and content of the curriculum have been and continue to be appropriate to addressing Malawi's manpower needs.

The effectiveness of Bunda's program is matched by its efficient use of limited resources. Since its establishment, Bunda's faculty has seldom exceeded 30, and thus its faculty-to-student ratios (current enrollment is 377 students) have been low. Costs per student remain low and student retention rates are high. In recent years the College has faced a shrinking operational budget, but it has adjusted without jeopardizing the basic quality of the educational program.

During the past 20 years, Bunda has functioned primarily as a teaching institution. With a heavy teaching load and a restrictive budget, the faculty has had little time to conduct research or to engage in other outreach activities. In recent years, however, the College has embarked on a promising research program on beans (through the A.I.D. Collaborative Research Support Program) and on smallholder intercropping.

The role of A.I.D. in Bunda's development has been very significant in assisting in faculty development. However, this assistance was not designed to link and utilize enhanced faculty capacities to the larger policy and research structures within the agriculture sector. As a consequence, the College remains relatively isolated from important centers of influence for agricultural development in Malawi.

Bunda's past represents a record of outstanding accomplishment, but changes within Malawi and within the College itself will require a new approach to the future. Within Malawi, the market for trained agriculturalists seems to be nearing the saturation point, and manpower projections for the remainder of the 1980s indicate a substantial decline in demand for agricultural manpower at the diploma and B.S. levels. Within Bunda College itself, the number of Ph.D. faculty will continue to grow as more Malawians return from overseas training. Indeed, the College now has the largest group of Ph.D. agricultural scientists in Malawi, yet their role is confined almost exclusively to teaching. Meanwhile, a young and mostly undertrained staff at the Ministry of Agriculture research stations is shouldering the heavy burden of administering a national research program with little involvement of the Bunda faculty. It seems essential that Bunda's scientific manpower be more directly engaged in supporting the national research program.

Major readjustments in current institutional arrangements would be required for Bunda to change from a teaching to a multipurpose college. As it now stands, the Ministry of Education assumes responsibility for supporting Bunda's teaching

role. Bunda has few institutional or budgetary linkages with the Ministry of Agriculture or other potential sources of funding in the national Government that would enable it to expand its research mission. Consequently, the College remains without the necessary institutional support to pursue a more activist role in the agriculture sector.

PROJECT DATA SHEET

1. Country: Malawi
2. Project Title: Bunda College of Agriculture
3. AID Project No.: A.I.D./afr/437 (1963-1970)
612-0054 (1976-1982)
4. Project Implementation Dates: 1963-1970
1976-1982
5. Project Funding:

| | <u>1963-1970</u> | <u>1976-1982</u> | <u>Total</u> |
|----------------------|---------------------------|------------------|---------------|
| A.I.D. Grant | US\$2,206,849 | US\$4,600,000 | US\$6,806,849 |
| Government of Malawi | US\$ 313,000 ¹ | US\$1,983,000 | US\$2,296,000 |
| Total | US\$2,519,849 | US\$6,583,000 | US\$9,102,849 |

6. Purpose:

To build a modern, localized agricultural training institute (Bunda College of Agriculture) capable of providing competent and skilled manpower for rural development.

¹The A.I.D. files are incomplete for the first Bunda project (1963-1970); thus there are no precise data on the financial contribution of the Government of Malawi during this period. Some documents indicate a Government of Malawi contribution of US\$313,000 for construction, but this may not include other contributions.

GLOSSARY

- ADD - Agricultural Development Division
- ADMARC - Agricultural Development and Marketing Corporation
- A.I.D. - Agency for International Development
- CRSP - Collaborative Research Support Program
- FAO - Food and Agriculture Organization
- kwacha (K) - Malawian currency (K1.75 = US\$1.00)
- MOA - Ministry of Agriculture
- UNDP - United Nations Development Program
- USAID - A.I.D. country field Mission

1. PROJECT SETTING

Thirty kilometers by road (much of it dusty and washboard surfaced) from the modern capital of Lilongwe lies an inauspicious-looking campus with its modest but functional brick buildings. This is the home of the Bunda College of Agriculture, named after Bunda mountain, a large granite outcropping on the Lilongwe plain, which looms behind the campus. The only agricultural college in Malawi, Bunda was established in 1966 as a constituent member of the University of Malawi, the only university in Malawi.

Prior to 1966, agricultural students who were diploma candidates (3 years of post-secondary schooling) were, by prior agreement, sent to Chibero College in Southern Rhodesia and to Egerton Agricultural College in Kenya. However, after independence in 1964, the new Government of Malawi recognized that many agricultural technicians and administrators would be needed to staff a growing economy and to replace the numerous expatriates who held most of the senior positions in agricultural management and research. It was intended that Bunda would train the manpower necessary for supporting agricultural growth in Malawi.

An effective agricultural college is important in Malawi because agriculture is the cornerstone of the economy. Eighty-five percent of Malawi's 6 million people live directly from agriculture. Most of the farm population is in the smallholder sector, where 50 percent of the farms are 2 hectares or smaller, and 28 percent of the heads of household are women. Maize is the dominant smallholder crop, followed by tobacco, cotton, groundnuts, pulses, and cassava. Over the past 20 years, the smallholder sector has grown, almost entirely through increases in area cultivated, by roughly 3 percent per year--which is equivalent to Malawi's population growth rate. Almost all arable land is now under cultivation.

Although much agricultural production is subsistence, smallholders--at least those with above-average resources--are clearly price responsive. An example is the substantial increase since 1981 in marketed maize (the basic staple in the Malawian diet) in response to increased prices paid for maize by the parastatal Agricultural Development and Marketing Corporation (ADMARC). In 1981 Malawi had to import maize because of drought; today ADMARC has more maize in its silos than it normally sells in a year.

The estate sector has been the major source of agricultural growth, with output increasing 17 percent annually since 1968. The estate sector has grown to include nearly 10 percent of agricultural land and 20 percent of agricultural production.

This sector now accounts for 85 percent of Malawi's export earnings--the primary exports being tobacco, tea, and sugar. In recent years, the growth of the estate sector has slowed, primarily because of a decline in tobacco prices.

The expansion of the estate sector in the 1970s was also accompanied by rapid growth in public sector investment for agriculture. In the early 1970s, the Government embarked on a major smallholder development program by setting up four large integrated rural development projects in the Lilongwe, Karonga, Shire Valley, and lakeshore areas. These projects were intended to be gradually replicated in other areas; however, because of the heavy capital outlays associated with this approach, the integrated rural development program was replaced in 1977 by a more focused national campaign that stressed the provision of agricultural inputs and farm services for smallholders. The country was divided into eight agricultural development divisions, with the intention that each division would initiate an adaptive research program designed to integrate research and extension and to link the experiment stations with smallholder agriculture--a link that was sorely lacking before. Three agricultural development divisions now have adaptive research teams in place, staffed by Bunda graduates.

The expansion of the estate and Government sectors in the 1970s, coupled with the gradual replacement of expatriate managers, created a major demand for Bunda graduates. However, in the 1980s, growing budgetary deficits, balance of payment pressures, and falling world market prices for Malawi's export commodities greatly reduced the demand for skilled agricultural manpower in both the public and private sectors.

2. PROJECT DESCRIPTIONS

2.1 Early Assistance, 1964-1966

Early initiatives and planning for Bunda College came from the Ministry of Natural Resources, which included the agricultural portfolio. However, the Ministry of Education enunciated a policy which directed that all diploma education should be included under its mandate. Thus, the Bunda initiative was transferred to the Ministry of Education and placed as a constituent college within the University of Malawi. In retrospect, it is apparent that this decision set the stage for a growing process of isolation between Bunda and the Ministry of Agriculture.

Beginning in 1964, the Agency for International Development (A.I.D.) provided several grants totaling US\$6.8 million to assist with the construction and staffing of the Bunda College campus near Lilongwe. By 1967 the campus was fully outfitted with classrooms, laboratories, office space, a dining hall, faculty housing, and dormitory space for 225 students. Finding sufficient faculty to staff the College was a difficult task because few Malawians held the necessary postgraduate degrees to qualify for faculty appointments.

2.2 The 1966-1970 Project

To help fill the staffing vacuum, A.I.D. entered into a 4-year contract in 1966 with the University of Massachusetts to enlist its faculty for long-term appointments at Bunda. The contract also included funds for sending nine Malawians for degree training at the University of Massachusetts, with the intention that they would return to Bunda as faculty members.

The primary objective of the A.I.D. assistance effort was to equip Bunda as a teaching or training institution. A University of Massachusetts faculty member designed the curriculum for the new College after reviewing agricultural education institutions in Kenya, Uganda, and Rhodesia. The curriculum emphasized intensive laboratory practicals and hands-on work on the 1,400-acre College farm to complement classroom teaching. Research was viewed as an important activity primarily for encouraging the professional growth of faculty and students.

During the 4-year contract period (1966-1970), the University of Massachusetts provided seven expatriate staff to Bunda. Each was assigned to 2-year terms in major teaching and administrative positions at the College. Because of the limited number of faculty at the College, there was little time to undertake research. All nine of the Malawians sent to the University of Massachusetts for degree training returned to Malawi--one with an M.S. degree and the others with B.S. degrees. Three returned to Bunda, and the others were appointed to various positions in the Ministry of Agriculture. That only one of the candidates secured an M.S. degree is reflective of the difficulties then encountered in finding qualified candidates for postgraduate training. The scarcity of trained manpower in the 1960s was such that even candidates who returned with B.S. degrees were drawn away from Bunda College. The University of Massachusetts contract, however, was of such short duration that none of the B.S. graduates could continue on to the M.S. degree program.

In 1970, the University of Massachusetts contract expired and was not renewed. For the next several years, A.I.D.'s involvement with Bunda was minimal. The College continued to function, mostly with expatriate faculty. By 1970 it had an enrollment of 180 students and had further expanded its program to include a 5-year degree program (2 more years beyond the 3-year regular diploma program).

2.3 The 1976-1982 Project

In 1976, at the request of the Government of Malawi, A.I.D. provided a new 5-year, US\$4.6 million grant to further expand Bunda's training capacity. The largest portion of these resources was used to finance the construction of additional dormitories, laboratories, classrooms, faculty housing, and equipment in order to expand Bunda's enrollment capacity to 380. The grant also included funding to send 20 Malawians for overseas master's degree training with the intent that they would return to Bunda as faculty members. Finally, grant funds were set aside for the provision of 27 person-years of expatriate faculty to help the College accommodate increases in enrollment and to replace Bunda faculty engaged in overseas training.

The objectives of the new project were ambitious because it was expected that by 1982 most of Bunda's still primarily expatriate faculty would be replaced by Malawians returning from overseas training. Like the 1966-1970 project, the new A.I.D. project was focused primarily on enhancing Bunda as a teaching institution. No grant funds were allotted for research, and there is no evidence in the project documentation that research was envisaged as a significant component of Bunda's mission.

During the 5-year project period, the construction and equipment components of the project were completed as intended, but shortfalls were encountered in the other areas of intended project achievement. Only 16 rather than 20 Malawians were sent for overseas degree training; 15 returned to the faculty, one with a B.S. degree and the others with M.S. degrees. Finally, only half of the planned 27 person-years of expatriate staff were provided to Bunda.

This shortfall can be attributed in part to a weak contracting mechanism. Unlike the 1966-1970 project, in this project A.I.D. did not contract with a U.S. university to provide the expatriate faculty and overseas training components. Rather, a contract was arranged with a U.S. educational exchange organization to recruit faculty from a wide range of sources and to coordinate the placement of Malawian degree trainees at a variety of U.S. universities. However, the

contractor did not actively pursue faculty recruitment, so there was a shortfall in this area. By 1982, only half of the project objectives had been achieved--enrollments and diploma graduates increased substantially, but the number of Malawian nationals on the faculty was far less than the project target.

2.4 The U.N. Development Program/Food and Agriculture Organization Project

This shortfall in attaining project objectives can be attributed to the fact that beginning in 1978, the objectives of the A.I.D. project were overtaken by the emergence of a large U.N. Development Program (UNDP)/Food and Agriculture Organization (FAO) project, which sent 28 Malawians from Bunda's faculty for overseas M.S. and Ph.D. training. Because of this draw-down in local faculty, much of the Bunda teaching load was still shouldered by expatriate faculty until 1983. By 1984, many of the Malawian faculty trained overseas began returning to Bunda, and by 1985 almost all of the expatriate faculty had been replaced by Malawian nationals. Bunda now has 31 senior faculty members, 16 with Ph.D. degrees and 15 with M.S. degrees. Another 15 faculty members will soon return from overseas training--8 with Ph.D. and 7 with M.S. degrees.

The changes in Bunda's faculty, brought about primarily by the UNDP/FAO project, represent a profound transformation in the character of the College, the implications of which are yet to be fully recognized within the larger structure of Malawi's institutional landscape. In large measure, the future growth and success of the College will depend on whether these issues are addressed and resolved in a manner appropriate to Malawi's own development needs.

3. PROJECT IMPACTS: FINDINGS AND ANALYSIS

3.1 The Student Body

Government policies have generally discounted the social demand for education and have supported the expansion of higher education only in accordance with the economy's capacity to employ new graduates. Consequently, only a small percentage of applicants have been allowed to enter the University of Malawi. Total enrollment in 1985 for the University of Malawi and its constituent colleges was 2,400 (the total population of Malawi is approximately 6 million). Admission to the University is

thus highly competitive; all applicants must take a rigorous written examination, and only those with high marks are accepted. The high student retention rates at Bunda are indicative of the scarcity value of higher education in Malawi.

In its early years, Bunda had some difficulty attracting students to the College because agriculture was not viewed as a high status profession. However, by the 1970s student preferences for admission to Bunda were quite high because of the social and economic rewards associated with Government service in agricultural occupations. Government policy has consistently ranked agriculture as its highest investment priority, and until recently the Ministry of Agriculture has been one of the most rapidly growing agencies in the Government. Bunda graduates were in high demand for positions of substantial program and management responsibility. Bunda graduates have also been able to move into the private sector, particularly in the estate enterprises, where many have risen to high-salaried management positions.

In its early years, Bunda College had a significant number of students who were mid-career Government employees within various agricultural occupations. Their field-level knowledge of practical problems served to keep the faculty knowledgeable and responsive to field needs. Also, younger, inexperienced students had an opportunity to learn from the in-service trainees. The in-service training effort has ceased to function at Bunda, and thereby has deprived the College of an important feedback mechanism in helping the faculty to ensure the relevance of its educational program.

Most of Bunda's students come from rural areas and small-holder families, particularly those from the central and northern regions, where there is little urbanization. Thus, most of the student body have a first- or second-hand acquaintance with agriculture. It is Government policy that the University should seek balanced representation from all three regions (north, central, and south) in Malawi. Women students are underrepresented at Bunda and at the University in general. It is a cultural norm for many Malawian families to give first priority to advancing the education of their male children.

3.2 The Faculty

The faculty--the key resource for any college--has been, until recently, in short supply at Bunda. Seldom has the senior faculty exceeded 30 members, and until recently, the majority were expatriates. Although the number of authorized College faculty positions has been increasing, a significant number of

these positions remain unfilled. Few qualified Malawian staff have been available, and many of those who departed for overseas training were not replaced with expatriates because the College salary scale was, and still is, insufficient to attract foreign nationals.

In the past, most of the expatriate staff at the College have been partially or entirely funded by overseas donors. High turnover among the expatriate staff, who usually served only 2-year terms, produced considerable discontinuity in staffing and course offerings at the College. In years when faculty vacancies were not filled, some courses in the affected disciplines were not offered.

Since 1983, Bunda's staffing problems have been rapidly resolved as the large number of Malawian faculty trained overseas (under the 1976-1982 A.I.D. project and the 1978-1983 UNDP/FAO project) began to return. By 1985 nearly all of Bunda's 31 senior faculty members were Malawian nationals--only a few were expatriates. Bunda's faculty will grow over the next several years as more Malawian faculty return from overseas training. Indeed, the College soon should be able to fill its full staffing complement of 45 senior faculty.

The overseas performance and rate of return of Malawian trainees at Bunda has been extraordinarily high--all 15 A.I.D. trainees returned to Bunda and remain there. Of the 28 Malawians trained overseas under the UNDP/FAO project (many were also former A.I.D. trainees), 24 have returned to Bunda, 2 have yet to complete their degree studies, and 2 others have taken positions elsewhere. The outstanding success of this overseas training effort is attributable to good selection procedures and to Bunda and Government policies that provide strong incentives for trainees to return to the College. All of the trainees were Bunda faculty members when sent abroad and were guaranteed a position upon their return. Also, under Government of Malawi policy, all trainees must sign an agreement promising to return to Bunda College for a specified period or to pay substantial monetary compensation to the Government. Even stronger provisions apply to Malawians seeking overseas employment in international donor agencies or multinational firms. The Government of Malawi does not usually permit its highly trained nationals to assume such positions.

In summary, for the first time in its 20-year history, Bunda College now has a sufficiently large faculty of highly trained Malawian nationals to conduct an effective education program without major expatriate staff assistance. There are still staff shortages in particular areas, principally in agricultural economics and home economics, but these gaps should be filled soon. The future challenge for Bunda will not be faculty recruitment, but rather the retention and professional

nurturing of a young and energetic faculty. Salary levels and fringe benefits seem adequate to retain faculty, at least for the near term. Because the faculty is so new, the promotion system has not yet been tested sufficiently to uncover its strengths or weaknesses as a mechanism for faculty evaluation and advancement. For the near term, the issues of salary and promotion will be overshadowed by the larger concern of how to support the professional aspirations and growth of this young faculty. This will present a formidable challenge to Bunda.

3.3 The Education and Training Program

The core curriculum for the College has remained basically intact since the inception of Bunda in 1966, when a University of Massachusetts professor designed the goals and content of the 3-year diploma program. This plan was based on the assumption that Malawi had a vast need for skilled manpower and that this need would be best addressed with a generalized curriculum. This program would provide students with a broad range of skills in the applied agricultural sciences rather than a specialized background in a particular discipline. With few exceptions, all students at Bunda follow the same course of study, with a primary emphasis on crop husbandry, followed by animal husbandry, agricultural engineering, and the rural social sciences. The curriculum emphasizes hands-on learning in laboratories and field practicals on the student farm.

A graduate-degree program was added to the curriculum in 1969; the top 25 percent of the 3-year diploma program graduates are allowed to extend their studies for another 2 years to earn a B.S. degree. This program provides a modest degree of specialization in a particular problem or discipline. Other changes in the curriculum have also improved the educational experience at Bunda. For example, a series of curriculum revisions in 1975 provided for greater hands-on laboratory work, and in 1980 the program was further strengthened by upgrading the amount and level of math and basic science courses (e.g., biology and chemistry). The faculty is currently considering the introduction of an options program, which would allow second-year students some specialization within a particular discipline. However, the more "generalist" nature of the curriculum would be preserved because the basic disciplines outside the specialization would account for 70 percent of the program.

As verified by the team's interviews with employers and former Bunda graduates, the relevance of the generalist curriculum has withstood the test of time and experience in Malawi.

Former students recognized the need for on-the-job specialization, but they also agreed almost unanimously that having a diploma in a specialized program area would decrease their choices in the job market. In a small country like Malawi, the job market for trained agriculturalists will always be limited, and job aspirants run a high risk when they acquire specialized skills without knowing what jobs will be available. Moreover, as the team found in its interviews with employers in organizations requiring specialized skills, many of the larger public agencies and private sector firms are prepared to finance overseas training for employees who need to improve their specialized skills.

The academic departments at Bunda are responsible for teaching courses, including laboratory and field practicals, in their specific disciplines as well as courses in the relevant basic sciences (e.g., biochemistry and biology). Adherence to a unified curriculum has minimized departmental fragmentation. Until recently there were only four major academic departments: crop production, agricultural engineering, livestock production, and rural development.

Students at Bunda follow a highly structured academic program. Student class/laboratory/fieldwork contact hours per week are very high, which appears to leave limited time for independent study. An extreme shortage of textbooks, a lack of photocopying facilities, and a scarcity of study space in the library serve to circumscribe the learning experience, particularly for diploma students. The A.I.D. assistance program did not include funds for textbooks. The scarcity of textbooks affects the quality of class lectures and puts an additional burden on the faculty, whose lectures must also cover the essential, basic information that students would normally obtain from textbooks.

Increased budgetary restrictions have reduced the funds available to support laboratory and farm practicals. Some faculty indicated that because of a shortage of field supervisors, some of the farm practicals are performed in groups, which reduces the hands-on experience of each student. They also indicated that because of a shortage of laboratory supplies, some laboratory exercises are conducted as demonstrations by faculty members, again leaving the students with fewer opportunities to perform their own experiments.

3.4 The Facilities

The physical structures at Bunda College--classrooms, dormitories, offices, and laboratories--are generally adequate for student and faculty needs. However, additional faculty

housing will soon be needed to accommodate Bunda's growing faculty. The campus grounds and buildings are well maintained. Most of the required laboratory equipment is available and in working order. The College library is well stocked with a wide range of books in the subject areas required by an agricultural college, and most of the internationally recognized professional journals in the rural and agricultural sciences also are available. However, the library is deficient in two major respects: the critical shortages of textbook copies (in a course for 120 students, only four or five copies of the required textbook may be available) and of study space (the library can seat only 90 students).

The College has a 1,400-acre farm, which, since 1976, has been run as a commercial enterprise directed by a farm manager responsible to the University of Malawi. Before this, the farm was used for student practicals, but it was argued that student involvement with livestock and crops had caused production declines and consequent financial losses for the farm. Student practicals are now confined to a more limited area, where it appears that students are unable to actively participate in the production disciplines at the level necessary to develop competence. Meanwhile, for reasons not entirely clear to the study team, the College farm is still losing money.

An enduring and very troublesome issue concerns the lack of infrastructure and facilities to overcome Bunda's physical isolation. The campus is located 30 kilometers by road from Lilongwe. The last 17 kilometers consist of a rough, dirt road, which is difficult to traverse at all times of the year and in the rainy season must be used with considerable caution. Phone communications with Bunda are also very poor. These conditions are major barriers to close interaction and communication between Bunda and other institutions and constituencies in the agriculture sector.

3.5 Employment and Career Paths of Bunda College Graduates

Throughout the 1970s, demand for Bunda's graduates in both the public and private sectors was high. In the 1980s, however, the pace of economic growth subsided, causing in turn a diminution in the demand for trained agriculturalists. Current manpower projections show a continuing decline in demand. In interviews, employers in the public sector--particularly in the agricultural development divisions--indicated a sharp decline in the demand for professional officers (those with B.S. degrees) and technical officers (those with diplomas). The same condition prevails in the private sector, where estate managers indicated that they anticipated only marginal additions to their

trained workforce in the foreseeable future. These responses are corroborated by recently conducted studies of manpower demand in the agriculture sector.

In the 1970s, the majority of Bunda's graduates were employed by the Government in the agriculture sector: primarily by the Ministry of Agriculture in the research and extension service, by the Agricultural Development and Marketing Corporation (ADMARC), and by the Ministry of Education as secondary school teachers for agricultural subjects. Within the Ministry of Agriculture, the Government's personnel rankings determined the entry position for those with a diploma and those with a B.S. degree. In the extension department, diploma graduates usually assume management positions as technical officers, supervising a number of technical assistants, who function as extension agents at the field level. Those with a B.S. degree usually enter middle-management positions as professional officers, supervising a number of technical officers.

Beginning in the late 1970s, more of Bunda's graduates began to be employed in the private sector--primarily by the tea, tobacco, and sugar estates. They generally begin as apprentice field managers or agronomists, with successful candidates gradually moving into field manager or senior technical positions after several years of on-the-job and formalized training.

The private sector rarely hires female Bunda graduates. Most of the Bunda graduates hired by the Ministry of Education as secondary school teachers are women. The Ministry of Agriculture tends to channel women into home economics jobs. There are few women in the extension system. Female technical officers are a distinct minority, and few women are agricultural credit officers. Given that approximately 28 percent of all farm households are headed by women, the dearth of women in the extension service probably reduces the flow of direct communication to this important segment of the farm population.

Most Bunda graduates remain with one organization throughout their careers, advancing to positions of greater responsibility and authority. Thus, nearly all middle- and senior-level managers in the Ministry of Agriculture are former Bunda graduates.

3.6 On-The-Job Performance of Bunda College Graduates

The team interviewed many Bunda graduates and their employers in a range of institutions, from the Ministry of Agriculture and the Ministry of Education to parastatal organizations and private firms. These interviews revealed that both employers

and graduates value highly the general agricultural training given at Bunda. Bunda graduates favored the generalist training because, as students, they did not know what jobs would be available when they graduated or what the nation's manpower needs would be. Most graduates with B.S. degrees also believe that, given today's labor market, some options for specialization in the later years at Bunda are desirable, but that the general agricultural degree should be retained.

Although all those interviewed recognized the importance of a generalist education, both graduates and employers emphasized a greater need for additional specialized training. Private firms are more likely to have a fixed plan of in-service training than public sector agencies. For example, a diploma graduate who joins a sugar estate as a field assistant receives on-the-job training and, after a year or two, may be sent to a series of short courses in South Africa or Swaziland. An exception is the medium-size tobacco estates, which cannot afford to individually train their managers.

In the public sector, the agricultural development divisions try to provide their subject matter specialists with postgraduate experience abroad. Subject matter specialists at lower levels of the extension system, most project officers (heads of rural development projects within the agricultural development divisions), district officers in charge of extension planning areas, and ADMARC estate managers learn through informal apprenticeships or by simply being thrown into the job. At Ministry of Agriculture research stations, those with B.S. degrees are generally sent for postgraduate training overseas as soon as external financing is available. There appears to be no special training provided to technical officers (diploma graduates) who serve as laboratory assistants at the research stations. Finally, the Ministry of Education provides Bunda graduates who become secondary school teachers with 1 year of specialized education courses at the University of Malawi.

3.7 The Research Program

Faculty at Bunda College are actively encouraged to devote 20 to 25 percent of their time to research, but this is difficult to achieve given their heavy teaching load and the lack of research funds. The research budget for the College was about US\$51,000 in 1985, which is insufficient to support an intensive research program. There are some opportunities for the faculty to participate or serve as consultants on research projects conducted at Government research stations, but this involvement is limited in scope and duration.

Current research at Bunda is generally applied research and focuses on the needs of the smallholder sector. Table 1 presents departmental objectives and ongoing research projects.

Considering the cadre of faculty holding advanced degrees and the interest they expressed during interviews, there is considerable potential for stimulating a more active research program at Bunda. For example, aside from the significant research underway at the College on smallholder needs, the faculty and Government are interested in undertaking research on value-added processes. This is particularly crucial given Malawi's landlocked position and the fact that transportation costs account for about 30 to 50 percent of the final price of a commodity. The bulk and weight of unprocessed agricultural commodities further intensifies the need for this type of research (for example, exporting corn oil rather than maize would reduce the weight and volume of the commodity for shipment).

In order to expand Bunda's research role, the faculty needs to be linked through some budgetary and program mechanisms to the agricultural research stations and agricultural development divisions. The possibility of generating such a cooperative effort was enhanced by the appointments of the Vice Chancellor of the College to the National Research Council and the Principal of Bunda College to the Agricultural Research Council. The Agricultural Research Council should provide an opportunity for greater liaison between Bunda and the Ministry of Agriculture, but to date the research role of the College has not been defined. The absence of measures to expand its research mission will seriously circumscribe the contributions of Bunda's young and talented faculty.

3.8 Financing Bunda College

The operating budgets of the four constituent colleges are included as line items in the University of Malawi budget; the University receives its funding from the Ministry of Education. Capital development proposals by each college must be approved in accordance with University priorities and then negotiated with the Ministry of Education and the Ministry of Finance. Until 1980, Bunda received adequate funding to cover its recurrent expenditures. After 1980, the pace of economic growth in Malawi began to slow, whereas recurrent Government expenditures continued to increase. To alleviate this imbalance, the Government has been undergoing a period of retrenchment, which has translated into a 20-percent decline in the real value of budgetary allocations for the University of Malawi and Bunda College. The Government has sought to compensate for this downward trend

Table 1. Research at Bunda College

| Discipline | Research Objectives | Ongoing Research |
|--------------------------|--|---|
| Crop Production | To improve crop production at small-holder and estate farms | <ul style="list-style-type: none"> -Studies on maize/legume crop rotation -Selection studies with UCA maize -Pasture and fodder production and utilization -Insect pest and entomophagous arthropod population status in mixed cropping systems -Evaluation of beans, cowpeas, groundnuts, and pigeon pea cultivars for resistance to rootknot nematode -Selection for yield in pigeon pea cultivars -Bean improvement project |
| Agricultural Engineering | To diminish postharvest storage losses by small farmers | -Grain drying and storage |
| | To obtain soil-errodability factors for some soils in the Bunda area | -Determination of USLE (Universal Soil Loss Equation) errodability factors for soils around Bunda College |
| Livestock Production | To improve production through disease control, proper housing, and feeding using locally available materials | <ul style="list-style-type: none"> -Evaluation of crop residues--maize stover, groundnut, and bean hulls--as feed for goats -Evaluation of various types of rabbit housing that could be used by smallholder farmers -Evaluation of the effects of drying and temperature on protein quality in terms of available lysine -Studies on the effects of bitter cassava on the growth and reproduction of pigs |
| | To assess repro-productive performance of cattle, pigs, goats and poultry, mainly for the smallholder sector | |
| Rural Development | To accelerate agricultural change and development in rural farming communities | <ul style="list-style-type: none"> -Studies of agricultural change and rural development in the Lilongwe Rural Development Project -Analysis of the application of appropriate technology to farm systems in Malawi |

by imposing a tuition fee for University students, which in 1985 was 200 kwacha per year. Even with the imposition of fees, it is unlikely that the financial condition of the University will improve significantly in the near future. Priority budgetary increases established in the Ministry of Education's 10-year master plan are largely for the expansion of primary and secondary education.

In general, Bunda has been able to operate effectively within existing financial constraints by adhering to a no-frills budget. But as noted above, few funds are available for research, and, as noted before, there is a shortage of textbook copies and laboratory supplies. Operating at its current enrollment capacity, there appear to be few additional cost-saving measures that Bunda could adopt--a reflection of Bunda's high rate of internal efficiency. The cost per student at Bunda in 1985 was 3,197 kwacha. The method for calculating this cost should be adjusted to include depreciation of Bunda's capital stock not covered in its operating budget. Although this method of calculation would show a higher per student cost, the cost of education at Bunda still remains low.

3.9 The Future of Bunda College

During the past 20 years the College has admirably fulfilled its primary mission as a teaching institution, thereby providing the critical mass of trained manpower required for a developing country. However, conditions are changing both within Malawi and within Bunda College.

Within Malawi, current and projected market responses indicate a decline in demand for trained agriculturalists. As in the past, when Bunda increased its enrollment in 1978 to meet a rising demand for its graduates, so in the current environment of economic retrenchment, the College may need to examine the possibility of reducing its enrollment to reflect the declining market for its graduates. Training students who, after graduation, will be underemployed or unemployed would be a misuse of faculty time, which might otherwise be devoted to research and outreach. An enrollment reduction will probably be difficult to administer under the current University budget formula, which allocates operating funds on the basis of the number of students enrolled.

Within Bunda, the composition and professional orientation of the faculty are changing, with many members taking leave to upgrade their degree training from the M.S. to the Ph.D. level in U.S. and West European Universities. A faculty previously

comprising members who were teachers only now has broadly trained scientists capable of and interested in combining research with teaching. Indeed, Bunda now has the largest group of Ph.D.-trained agricultural scientists in Malawi, yet its mission is still almost exclusively confined to teaching. Meanwhile, a young and mostly undertrained staff at the Ministry of Agriculture research stations is shouldering the heavy burden of administering a national research program with little involvement by Bunda faculty. It seems essential, therefore, that Bunda's faculty should be more engaged in supporting the Ministry of Agriculture's research agenda. If deprived of the essential support needed to enable the College to flower as a major research and teaching institution, many of Bunda's young and talented faculty may either drift away from the College in frustration or contract their services in ad hoc consultancies that have little relationship to the Government's central research programs.

Major readjustments in current institutional arrangements would likely be required for Bunda to move from a teaching to a multifunctional college. The Ministry of Education bears responsibility for supporting Bunda's educational role, but understandably the Ministry does not view its role as one of financing agricultural research. The Ministry of Agriculture funds agricultural research at its experiment stations, but it has no institutional or budgetary linkage with Bunda. Consequently, Bunda remains without the necessary institutional support to pursue a more activist role in the agriculture sector.

Countries have addressed the issue of institutional linkage in various ways. In some countries, agricultural universities are directly under the administration of the major consumer of agricultural education and research--the ministry of agriculture. In other countries, agricultural colleges are accountable to the ministry of finance, where they are budgeted not only as educational institutions but also as resource centers supporting national development priorities and programs in agriculture. In still other countries, both the ministry of agriculture and the ministry of education share strong budgetary and supervisory responsibilities for agricultural universities.

A revival of Bunda's consultative committee would be a positive step in strengthening linkages with important constituent groups. This committee was established by Bunda in the early years of its operation and consisted of leaders from important public and private sector client groups. In recent years, the committee has ceased to function.

Ultimately, the determination of Bunda's role and its linkage to the larger institutional arena must reflect what is appropriate for conditions in Malawi. Until such actions are initiated, Bunda's future contribution to Malawi's agricultural development may be seriously constrained.

4. LESSONS LEARNED

1. Donor projects designed to develop agricultural universities should use contractors who have a strong institutional commitment to higher education. Institutional development programs require a long-term perspective, strong field support, and considerable attention to professional excellence in the recruitment of technical assistance specialists. In great measure, few of these characteristics were evident in the A.I.D. assistance effort at Bunda. The University of Massachusetts contract ran for only 4 years. During the second phase of A.I.D. assistance (1976-1982), the contracting agent for technical assistance had no comparative advantage or institutional resources of its own in agricultural higher education. As a consequence, recruitment of long-term consultants was haphazard and incomplete and field support less than adequate. This produced some discontinuity in Bunda's staffing.

2. Institutional proliferation can weaken the impact of all components of higher education and research and, in particular, can deprive other sectors of essential investments. The University of Malawi consists of four separate campuses, all of which are far from each other, thereby precluding the possibility of cooperation in teaching and research. Aside from Bunda College, the Ministry of Agriculture has its own National Resources College, along with a research establishment at the Chetedze experiment station and at several other sites. This condition has resulted in the unneeded duplication of teaching and research resources and has created an excessive recurrent cost burden.

3. In small countries, a fragmented institutional structure in the education sector could greatly impede efforts in faculty career development. The dispersed nature of the agricultural and educational establishment in Malawi could impede efforts at sustaining faculty vitality at Bunda. Duplication of educational and research structures in Malawi has left each component with a small staff. Given the small size of the Bunda faculty, chances are increased that younger and mid-career faculty will find it difficult to advance to

positions long held by senior staff. Likewise, limited faculty numbers will also make it difficult for mid-career faculty to take advantage of secondments or study leaves for their professional growth.

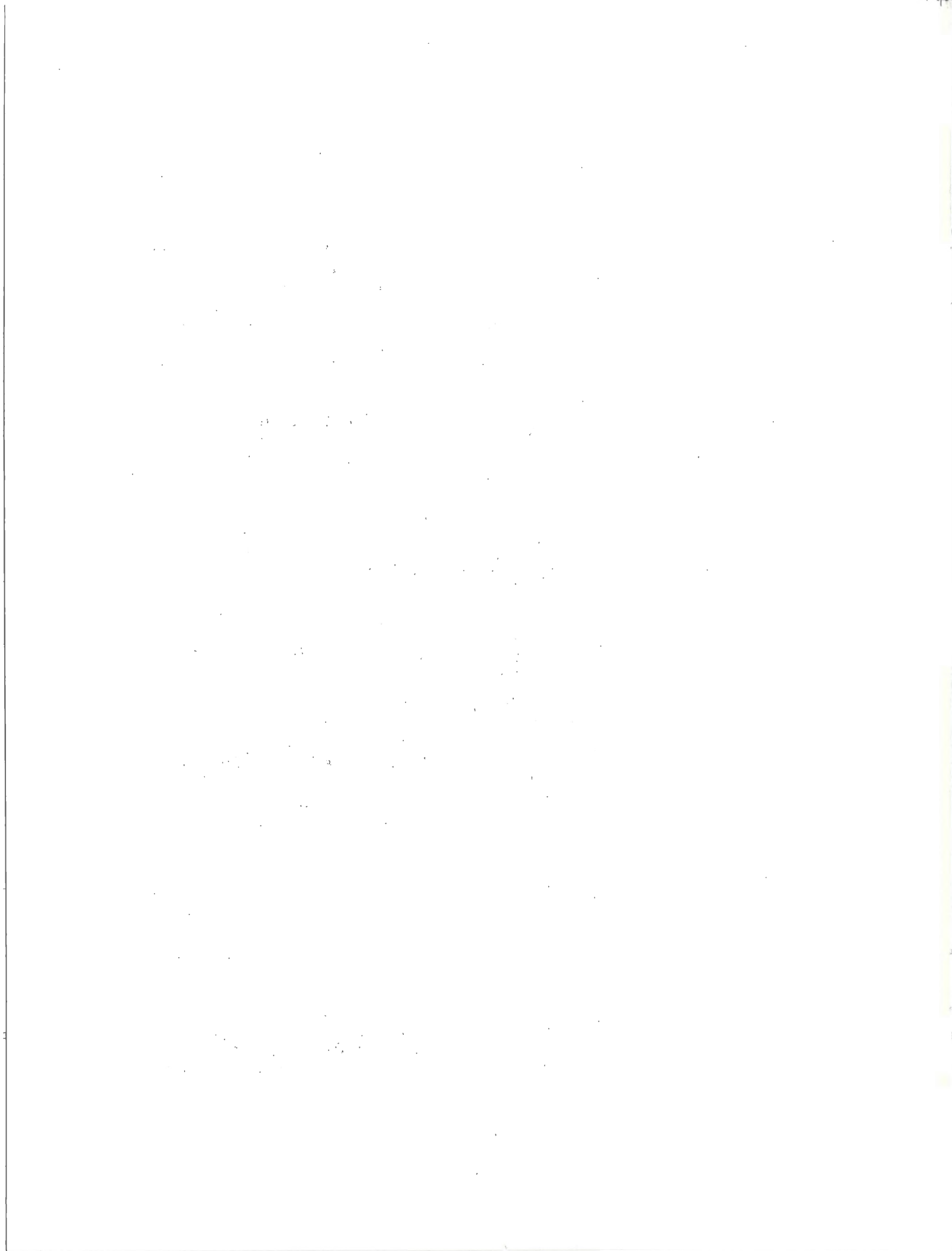
4. Greater emphasis needs to be placed on strengthening mechanisms of accountability in ensuring that agricultural universities are addressing relevant needs within the agriculture sector. Bunda's primary institutional link is with the Ministry of Education; it has no routine institutional or budgetary link with the Ministry of Agriculture. Consequently, Bunda remains a college without a constituency--it has no vital dialogue on the relevance of its education and research program. The Ministry of Education, which is the primary funding agency for the College, has no agricultural expertise for assessing the needs and relevancy of the Bunda program. Because of budgetary shortfalls, other mechanisms for strengthening accountability have ceased to function at Bunda. Thus, the external examiner process for examining B.S. candidates, the in-service training of Government officials, the use of farm days for farmers to visit the campus, and the consultative council for Bunda, which consisted of leading representatives from the public and private sector, are now all inoperative. All of these mechanisms have the potential of providing a college with vital feedback and support in the formation, revision, and maintenance of its programs.

5. Small countries like Malawi should exercise considerable forethought in determining whether to embark on the development of graduate degree programs in the agricultural sciences. There has been some interest in having Bunda College develop a master's degree program in the agricultural sciences. The argument could be made, however, that higher opportunity costs are incurred when scarce economic and manpower resources are diverted from a balanced support of teaching/research toward the training of a small number of graduate students. In addition, considerable inbreeding can occur if a student pursues an entire undergraduate and graduate training program under a small faculty. It may be more appropriate to use the ample supply of donor- and host-government-financed overseas training opportunities for graduate training rather than to follow an import-substitution policy of using scarce human capital to support a labor-intensive graduate program.

6. In small countries like Malawi, the rationale for supporting a more multifunctional role for an agricultural college is to maximize the college's contributions to national development. Bunda was established as a teaching institution with the intent that it would provide urgently needed trained manpower for the agriculture sector. By the mid-1980s, Malawi had effectively addressed most of its basic agricultural

manpower needs at the diploma and B.S. levels, and its agricultural system moved into a second phase of maturity. Malawi's market for diploma and B.S. graduates is now near saturation, and Bunda's mandate must be expanded to include a new set of objectives: research to generate and transfer technologies to the smallholder sector. By acquiring a more multifunctional teaching/research role, the College can adapt its services to changing conditions in Malawi and thereby maximize its expertise. Although there are other arguments for supporting a multifunctional college, the economic rationale assumes primacy because Malawi, like many other small countries, cannot afford the luxury of narrow, institutional specialization.

7. Donor projects designed to build any one component of a national agricultural education, research, or extension system should also include the development of linkages among these individual functions. Neither the A.I.D. project nor the UNDP/FAO project for Bunda was designed to directly address the institutional linkage issue. Their assistance should have strengthened not only the agricultural College itself but also its relationship with the larger institutional system, which is active in agricultural research, extension, and education. Conversely, donor projects that seek to strengthen components of the agricultural research, extension, and education systems outside of Bunda College should be designed to build linkages with the College.



APPENDIX A

STUDY METHODOLOGY

by Gary Hansen

The objective of the study was to assess the evolution of Bunda College, its contributions to the larger process of rural development, and its relationship to the national policy and institutional arena in the agriculture and education sectors. The study team was intent on assessing whether Bunda's outputs (e.g., trained students, research) were and are appropriate to the past, current, and future development needs of Malawi's rural sector. Likewise, the team sought to assess how the outputs were being utilized or underutilized within the agricultural system. Particular concerns included a review of the skills acquired by students at Bunda and the relevance of this training to employment prospects, on-the-job performance, and eventual career paths. Considerable attention was devoted to determining whether manpower projections for the next decade indicated a need for a shift in the number and kinds of trainees graduating from Bunda. In both instances, information on these questions was secured from the major employers of Bunda graduates and from the various Government agencies involved in manpower planning.

To assess the effectiveness of the utilization of Bunda outputs, the team also examined Bunda College itself and its particular mission as Malawi's only agricultural college. The team attempted to assess the quality of the educational experience at Bunda and the relationship of the College to the institutional system serving the rural sector. Particular attention was devoted to understanding the linkage between Bunda and the larger agricultural research, extension, and educational system, and how the resources of the College could best be used to support the various agencies involved in the agricultural development process. The team interviewed a wide range of institutional actors, particularly in the Ministry of Agriculture, the Ministry of Education, and the Ministry of Forestry and Natural Resources.

The team spent September 1985 in Malawi. During the first week, the team met with Ministry of Education and Ministry of Agriculture representatives and with the leadership of Bunda College and the University of Malawi to discuss the goals of the study. During this time the team also reviewed documents from the USAID Mission library and project files. A.I.D. documentation of the two projects with Bunda is incomplete, and this seriously hampered the efforts of the team to reconstruct the details and history of the A.I.D. assistance effort. Only one

1979 A.I.D. evaluation report of the Bunda activity is on file, and only one end-of-tour report was available for the second project, even though many consultants served on this project. In part, this lack of documentation reflects the fact that there was no USAID Mission in Malawi during the 1970s, when Malawi was served by a regional A.I.D. office in Swaziland.

During the second and third week of their stay, the team interviewed the major employers of Bunda graduates. The study team visited the staff of the three major Government research stations for smallholder research. The team also visited the major tea, tobacco, and sugar estates, including the agricultural enterprises under Press Farming Limited and General Farming Company Limited. Interviews were also conducted with the Agricultural Development and Marketing Corporation (ADMARC), the major parastatal responsible for agricultural marketing. Many interviews were conducted with the staff of the agricultural development divisions under the Ministry of Agriculture. Malawi is divided geographically into eight divisions, with each agricultural division coordinating the smallholder extension and farming systems research underway in its region. The team visited four of the agricultural development divisions. Finally, the team also visited the Natural Resources College under the Ministry of Agriculture and the Polytechnic College, which is a constituent college of the University of Malawi.

The initial interviews were conducted by the entire team so that each member could acquire a basic understanding of institutional roles in Malawi. Thereafter, team members pursued special areas of interest individually or in pairs. In interviewing employers, the team tried to secure information from both managers of the firms and other employees who were graduates of Bunda. Finally, the team tried to ensure regional representation by conducting interviews in the central and northern regions of Malawi, as well as in southern Malawi (the most densely populated and commercially active region).

During its last week in Malawi, the team devoted its time almost exclusively to interviews with the faculty at Bunda College. The team tried to acquire a deeper understanding of Bunda's educational program and to secure faculty assessments of current issues for the College and aspirations for the future. During the final days of the study, the team met with the faculty to discuss the team's findings and recommendations. Finally, prior to its departure, the team had a debriefing meeting sponsored by the Ministry of Education, with representatives from the Ministry of Agriculture, Press Farming Limited, the National Bank of Malawi, Bunda College, and the University of Malawi in attendance.

APPENDIX B

A.I.D. AND THE DEVELOPMENT OF BUNDA COLLEGE: 1966-1985

by Gary Hansen

Prior to Malawi's independence in 1964, agricultural students who were diploma candidates (3 years of post-secondary schooling) were, by prior agreement, sent to Chibero College in Southern Rhodesia and to Egerton Agricultural College at Nkoro, Kenya. To develop its own in-country training capacity, the Government of Malawi established Bunda Agricultural College in 1966. As a diploma-granting institution, the College became a constituent member of the University of Malawi.

The College started inauspiciously on September 7, 1966, with an enrollment of 37 diploma candidates. Because of construction delays for the main Bunda campus, students and faculty were housed in temporary quarters at the Dedza Secondary School, 65 miles from the planned campus site. In September 1967, the new Bunda campus was opened 20 miles from the capital city of Lilongwe. In this second year, there were 47 new diploma enrollees, bringing total enrollment to 95 students. In addition, 18 mid-career officials were accepted from the Ministry of Agriculture for a 1-year upgrading course.

1. THE FIRST A.I.D. PROJECT (UNIVERSITY OF MASSACHUSETTS): 1966-1970

Technical advisers recruited by the College of Agriculture at the University of Massachusetts¹ were major actors in the design and initiation of the Bunda College program. In 1963, the University of Massachusetts sent several long-term advisers to Malawi to assist the Government of Malawi in improving the training and organization of its extension service. With the advent of Bunda College and A.I.D.'s decision to assist in its development, the contract was amended in 1966 to allow the University of Massachusetts to expand its activities in support of Bunda.

¹One long-term technical adviser was recruited from the faculty at the University of Massachusetts; the other technical advisers were recruited from the extension service of other agencies in the state.

From an era before A.I.D.'s adoption of Project Identification Documents, Project Papers, and logical frameworks, the A.I.D.-University of Massachusetts contract is a four and one-half page, double-spaced document of great simplicity and brevity. The objective of the contract is in one paragraph and reads as follows:

Objective: Contractor (University of Massachusetts), in cooperation with officials of the cooperating Government's Ministry of Natural Resources and Surveys (hereinafter referred to as the "Ministry") and the Mission Director, shall provide technical advice and assistance at Bunda College of Agriculture (the College) near Lilongwe, Malawi, to intensify agricultural extension and training activities because of their importance in agricultural development.

This paragraph is followed by an itemized scope-of-work, which indicates that the University of Massachusetts will provide faculty to advise and assist Bunda College in curriculum development and teaching and in the selection of Malawian participants for long-term degree training in the United States and in third world countries. The contract also indicates that A.I.D. would fund four long-term University of Massachusetts lecturers for Bunda in the areas of agricultural science, agricultural biology, animal science, and extension methods.

1.1 Project Performance

Establishing a new college is a formidable task under any conditions, and in the early years of its operation Bunda experienced the usual growing pains involved in building a cohesive staff, establishing administrative procedures, achieving some consensus on curriculum, and coping with the high performance expectations generated by the College.

The University of Massachusetts filled all four lecturer positions for the entire 4-year duration of the contract (1966-1970). Each lecturer served a 2-year term. Their areas of expertise included agricultural chemistry, agricultural biology, extension, and crop production. In the early years of the College, there were not enough qualified Malawians to fill faculty positions or to send for advanced postgraduate training. Of nine participants sent for degree training at the University of Massachusetts, seven were sent for B.S. degrees (all received their degrees) and only two were sent for M.S. degrees; neither of these two were assigned to Bunda College after returning to Malawi.

A.I.D. allotted over US\$1 million in grant money for the construction of classrooms, dormitories, laboratories, and administrative facilities for a maximum student body of 280. Procurement problems (many of the building supplies and materials had to be of U.S. origin) delayed completion of the campus construction by 1 year, thereby forcing the move to the temporary site at Dedza.

By 1968, Bunda had a total enrollment of 153 students and a staff of 16 lecturers. Only one lecturer was a Malawian national; the remainder were expatriates who received funding from an assortment of foreign donor agencies. By 1970, enrollment had grown to 167, and although Bunda was assigned 23 faculty positions, only 19 were filled. With the addition of a B.S. degree program in 1969, department heads and key faculty members carried an average course load of 16 hours in addition to supervisory responsibilities. Bunda originally had only a 3-year diploma program but added a 5-year degree program in 1969. In the 1970-1976 period the degree program was reduced to 4 years--with students spending the first 1 or 2 years at Chancellor College and the remaining years at Bunda.

1.2 Project Impact

The A.I.D. project with Bunda was terminated in 1970. The termination was greeted with considerable frustration by the University of Massachusetts team, who believed that the contract should be renewed for another 4 years to ensure the consolidation of past gains. There was concern that previous achievements would be undermined by the rapid expansion then underway at Bunda. For example, some members of the University of Massachusetts team were not enthusiastic about the initiation of a B.S. degree program at Bunda.

In retrospect it is apparent that the impact of the initial A.I.D. project with Bunda was most pronounced in the areas of construction and curriculum development. The basic physical plant was financed by the A.I.D. grant, and these buildings still constitute a major section of the Bunda campus. All are well maintained, although because of their age they are beginning to show some signs of wear.

Aside from the "bricks and mortar" impact, the most sustained impact of the project can be found in the curriculum and basic concept of the College itself. Since Bunda's inception, its curriculum has remained relatively intact as the cornerstone of the Bunda program. The curriculum plan, adopted by Bunda in 1966, was designed by a University of Massachusetts consultant. The plan was based on the assumption that Malawi's vast need for

skilled manpower would be best addressed by a generalized curriculum that provided students with a broad range of skills in the applied agricultural sciences rather than a specialized background in a particular discipline. With few exceptions, it was intended that all students would follow the same course of study, with a primary emphasis on crop husbandry, followed by animal husbandry, agricultural engineering, and the rural social sciences. Considerable emphasis was also given to hands-on learning in laboratory exercises and field practicals on the College farm.

Finally, of the nine faculty members trained in the United States, two remain on the faculty at Bunda. (Both returned to the United States to secure their M.S. and Ph.D. degrees.) One is currently head of the Livestock Production Department, the other is a senior lecturer in the same department. Four of the remaining seven University of Massachusetts trainees are employed in the Ministry of Agriculture. Another trainee is associated with the United Nations Development Program (UNDP), and one is employed by the International Institute of Tropical Agriculture in Nigeria. The remaining trainee could not be located. It is evident that in the early years of Bunda's development, the initial A.I.D. project did not contribute to a significant enlargement of the Malawian faculty.

In summary, the current physical structure and curriculum of Bunda College are very much the product of the 1966-1970 A.I.D. project. However, the institutionalization of the curriculum occurred after A.I.D.'s departure, and therefore its carry-over into the postproject period cannot be directly attributed to A.I.D.'s contribution. According to some reports, the original curriculum underwent several changes that apparently contravened the intent of the University of Massachusetts plan. When the University of Massachusetts team departed in 1970, they did not know whether the core of the original curriculum would remain intact. However, in the early 1970s the curriculum reverted to the original University of Massachusetts plan.

2. THE SECOND A.I.D. PROJECT: 1976-1982

In 1973, the Government of Malawi submitted a request to A.I.D. for assistance in expanding Bunda College's capabilities in its crop production, rural development, and livestock departments. A.I.D. responded by sending a three-person team to review the agricultural manpower needs of Malawi and the requirements for an expansion of Bunda's enrollment, staff, and physical plant. The team concluded that Bunda would need to double its annual enrollment intake to 105 by 1976/1977 and increase its B.S. degree program intake to 30 in order to meet

current and future demands for skilled manpower in the public and private sectors. These recommendations entailed expanding the facilities and the faculty to service a total enrollment of around 380 students.

These manpower projections prompted A.I.D. and the Government of Malawi to sign a project agreement in 1976, with A.I.D. providing a US\$4 million grant and the Government of Malawi providing US\$1.983 million to expand Bunda's faculty and physical structure in order to meet an enrollment increase from 209 to 452 students.

The major project inputs included the following:

- 27 person-years of A.I.D.-financed technical assistance
- US\$400,000 of A.I.D. funds for training 20 Bunda College staff to the B.S. and M.S. levels
- US\$273,000 of A.I.D. funds for purchasing commodities to equip the new soils and animal science laboratories and to supplement existing audiovisual equipment
- US\$2 million of A.I.D. funds and US\$1.164 million from the Government of Malawi for constructing faculty/staff housing, dormitories, lecture rooms, a student union extension, a sports field, laboratory/classrooms, and an agricultural engineering and maintenance block
- US\$819,000 from the Government of Malawi to cover recurrent costs

2.1 Project Performance

By the end of the project in 1982, only 14 years of the planned 27 years in technical assistance had been provided. A 1979 A.I.D. evaluation of the project attributes this shortfall to the weak performance of the U.S. firm (an educational exchange institution) contracted to recruit and support the expatriate lecturers for Bunda. By the end of the project, only 16 of the planned 20 candidates had been sent to the United States for degree programs. Fifteen returned to the faculty (one candidate died while undertaking her studies in the United States). Of the 15 returnees, 14 received M.S. degrees and 1 received a B.S. degree.

2.2 Project Impact

The Project Paper states that the purpose of the 1976-1982 A.I.D. project was "to build a modern, localized agricultural training institution which is capable of providing competent and skilled manpower sensitive to the technical, social and managerial problems influencing rural development." The following were to be used as indicators of the achievement of project purpose: (1) adequate laboratory facilities, dormitories, and field space for student needs; (2) a 90-percent Malawian faculty; (3) both degree programs (3-year diploma and 5-year B.S.) in place and functioning; and (4) properly balanced classroom, laboratory, and field teaching curriculum.

By 1982, the College had adequate facilities for 380 students. The College did not yet have a 90-percent Malawian faculty, although it was rapidly moving in this direction. Finally, the 3-year diploma program and the 2-year additional training for the B.S. degree (admission to which was reserved primarily for the top 25 percent of the diploma graduates), were in place, with programs emphasizing classroom as well as laboratory and field teaching.

The project intended to increase Bunda's annual diploma graduates from 45-50 to 65 and B.S. graduates from 10-15 to 23. As indicated in Table B-1 Bunda far exceeded these targets. A second intention of the project was to increase the number of senior teaching staff from 26 (1976) to 36. By 1982, the total number of available teaching staff was 27. During this time a large United Nations Development Program (UNDP)/Food and Agriculture Organization (FAO) project with Bunda ran concurrently with the A.I.D. project, which somewhat delayed the impact of the A.I.D. activity.

2.3 The UNDP/FAO Project: 1978-1985

In 1978, the UNDP/FAO initiated a US\$3.4 million project with Bunda for procuring equipment and upgrading its teaching faculty. Through this project a total of 28 Bunda faculty were sent abroad (mostly to the United States, Canada, and the United Kingdom) for Ph.D. and M.S. degree training. Eight of the faculty who secured their M.S. degrees under the 1976 A.I.D. project were able to extend their stay in the United States under UNDP/FAO sponsorship or, in some cases, after 1 or 2 years at Bunda, to return abroad to secure their Ph.D.s under the U.N. program. In total, 12 faculty members received Ph.D. degrees and 14 received M.S. degrees under UNDP/FAO sponsorship.

Table B-1. Numbers of Diploma and Degree Graduates and Retention Rates for Diploma Students, Bunda College, 1969-1985

| Year | Diploma Intake | | | Total Enrollment | | | Graduates | | | | | | Retention Rate ^a |
|----------------------|----------------|------|-------|------------------|------|-------|-----------|------|-------|--------|------|-------|-----------------------------|
| | M | F | Total | Per Year | | | Diploma | | | Degree | | | |
| | | | | M | F | Total | M | F | Total | M | F | Total | |
| 1968/69 | 57 | 10 | 67 | 142 | 11 | 152 | 23 | - | 23 | | | 3 | 70 |
| 1969/70 | 64 | 6 | 70 | 153 | 14 | 167 | 25 | - | 25 | | | | |
| 1970/71 | 70 | 9 | 79 | 189 | 21 | 210 | 40 | 7 | 47 | 3 | - | 3 | 70 |
| 1971/72 | 42 | 9 | 51 | 168 | 18 | 186 | 41 | 3 | 44 | 13 | - | 13 | 63 |
| 1972/73 | 52 | 7 | 59 | 167 | 22 | 189 | 58 | 7 | 65 | 12 | - | 12 | 84 |
| 1973/74 | 57 | 4 | 61 | 188 | 17 | 205 | 36 | 7 | 43 | 9 | - | 9 | 85 |
| 1974/75 | 43 | 7 | 50 | 206 | 17 | 223 | 45 | 4 | 49 | 15 | - | 15 | 83 |
| 1975/76 | 41 | 10 | 51 | 208 | 20 | 228 | 48 | 2 | 50 | 20 | - | 20 | 82 |
| 1976/77 | 75 | 15 | 90 | 207 | 27 | 234 | 38 | 3 | 41 | 23 | 1 | 24 | 82 |
| 1977/78 | 62 | 3 | 65 | 215 | 27 | 242 | 17 | 3 | 20 | 28 | - | 28 | N.A. |
| 1978/79 | 95 | 30 | 125 | 318 | 55 | 373 | 56 | 14 | 70 | 16 | 1 | 17 | 78 |
| 1979/80 | 92 | 28 | 120 | 319 | 62 | 381 | 58 | 3 | 61 | 32 | 5 | 37 | 94 |
| 1980/81 | 90 | 31 | 121 | 334 | 91 | 425 | 89 | 22 | 111 | 36 | 5 | 41 | 89 |
| 1981/82 | 104 | 15 | 119 | 353 | 73 | 426 | 90 | 24 | 104 | 30 | 6 | 36 | 87 |
| 1982/83 | 73 | 15 | 88 | 334 | 65 | 399 | 93 | 20 | 113 | 35 | 5 | 40 | 93 |
| 1983/84 | 70 | 19 | 84 | 306 | 61 | 367 | 100 | 14 | 114 | 20 | 8 | 28 | 96 |
| 1984/85 ^b | 100 | 20 | 120 | 314 | 54 | 373 | | | | | | | |
| Total | | | | | | | | | | | | | |
| No. | 1,187 | 238 | 1,425 | 4,121 | 660 | 4,781 | 857 | 133 | 990 | 292 | 31 | 323 | 80 (average) |
| Percentage | (83) | (17) | | (86) | (14) | | (87) | (13) | | (90) | (10) | | 40-60 (range) |

^aNumber of diploma recipients in a given year divided by diploma intake 3 years previously.

^bGraduation not until November 1985.

Of the 28 faculty members sent abroad, 24 have returned to Bunda, 2 have taken assignments elsewhere, and 2 remain abroad completing their studies.

During the 1978-1984 period, when many Bunda faculty members were engaged in overseas training, the UNDP/FAO project provided 314 person-months of expatriate faculty to fill the vacancies at Bunda. Thus, a total of 12 expatriate faculty members were on the faculty under UNDP/FAO sponsorship, with individual assignments averaging about 3 years. Some of these faculty served as heads of department at Bunda in addition to assuming a full teaching load.

3. THE A.I.D. AND UNDP/FAO IMPACT

The impact of the UNDP/FAO project was twofold. First, it enabled Bunda to fill nearly all faculty positions with Malawians: 26 of the current 29 faculty members in the agricultural departments are Malawians. Second, it provided faculty training sufficient to develop a large core staff with Ph.D. degrees: 16 of the 29 faculty members hold Ph.D. degrees, and 8 more will soon return from overseas Ph.D. training. (Table B-2 shows the degrees held by the Bunda faculty.)

In addition to staff growth, the most solid achievement at Bunda has been the training of agricultural specialists. By 1983, a total of 1,029 diploma and B.S. degrees had been granted by Bunda College--approximately one-quarter of all the degrees granted by the constituent colleges of the University of Malawi.² Bunda has maintained this level of graduates with a relatively small faculty; seldom has the senior teaching staff exceeded 30. Because the faculty has been fully preoccupied with a heavy teaching load, Bunda has remained primarily a teaching institution. Until recently, little time or resources were available for research and outreach activities.

Together, the impact of the A.I.D. (1976-1982) and UNDP/FAO projects served to greatly expand Bunda's enrollment and faculty capacity, although these achievements were somewhat out of phase with each other and so produced some strain in the teaching program. In 1979, total enrollment expanded to 440 students, thus placing a considerable burden on the teaching staff. Although there were many expatriates on the faculty, some positions

²Some of Bunda's graduates were from other African countries. In any 1 year Bunda usually has four or five students from other African countries.

Table B-2. Degrees Held by Malawians on the Teaching Faculty of Bunda College, 1974, 1982, and 1985

| Highest Degree Held by Malawian Faculty Members ^a | 1974 | | | | | | 1982 | | | | | | 1985 | | | | | |
|---|-----------------|-----------|-------------|----------|----------|----------|-----------------|-----------|-------------|----------|----------|-----------|-----------------|-----------|-------------|-----------|-----------|-----------|
| | In Residence | | On Leave | | Total | | In Residence | | On Leave | | Total | | In Residence | | On Leave | | Total | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Diploma | 0 | 0 | 5 | 50 | 5 | 33 | 0 | 0 | 3 | 18 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bachelors | 3 | 60 | 4 | 40 | 7 | 47 | 9 | 41 | 4 | 24 | 13 | 33 | 1 | 4 | 8 | 35 | 9 | 23 |
| Masters | 1 | 20 | 1 | 10 | 2 | 13 | 8 | 36 | 9 | 53 | 17 | 44 | 10 | 42 | 7 | 30 | 17 | 43 |
| Doctorate | <u>1</u> | <u>20</u> | <u>0</u> | <u>0</u> | <u>1</u> | <u>8</u> | <u>5</u> | <u>23</u> | <u>1</u> | <u>6</u> | <u>6</u> | <u>15</u> | <u>16</u> | <u>66</u> | <u>8</u> | <u>35</u> | <u>14</u> | <u>35</u> |
| Total | 5 | 100 | 10 | 100 | 15 | 100 | 22 | 100 | 17 | 100 | 39 | 100 | 27 | 100 | 23 | 100 | 40 | 100 |

^aExcludes faculty in English/Communication.

vacated by Malawians departing for overseas study remained vacant because salary levels were insufficient to attract expatriate replacements. Consequently, in some years certain courses were not taught because of the absence of teachers. Enrollment expansion also strained the space and resources available in the library. The library has a seating capacity of only 90, so library access is limited for many of Bunda's students. The library is also short of textbooks, making it difficult for many students to review the required reading material. This, in turn, has put more pressure on the faculty to deliver essential information through lectures rather than using class time for open discussion with the students.

Finally, by the time both projects ended in the early 1980s, the recurrent costs for Bunda had expanded far beyond the levels anticipated in the original project designs. The rise in recurrent costs was a consequence of worldwide inflation and other economic pressures of the late 1970s and the slowdown in the growth of the Malawian economy during the early 1980s. The College has been able to offer only minimal services in order to support faculty salaries and student costs. Few resources are available for research or other programs not directly related to the basic teaching program. Tables B-3 and B-4 present data on budget and student costs for the University of Malawi and Bunda College.

Table B-3. University of Malawi, Budget and Student Costs, 1980/1981-1985/1986
(in Kwacha)

| Year | Price Index | University Budget | | Student Enrollment | Cost (budget) per Student | |
|-------------------|-------------|-------------------|-------------|--------------------|---------------------------|-------------|
| | | Current Kwacha | 1980 Kwacha | | Current Kwacha | 1980 Kwacha |
| 1980/1981 | 100 | 6,586.149 | 6,586,149 | 2,122 | 3,104 | 3,104 |
| 1985/1986 | 165.3 | 8,757,336 | 5,297,800 | 2,400 | 3,658 | 2,207 |
| Percentage Change | 65 | 33 | -20 | 13 | 18 | -29 |

Table B-4. University of Malawi, 1985/1986 Budget by College
(in Kwacha)

| College | 1985/1986 Budget: Total, K. | | Student Enrollment | Cost (budget) per Student | |
|---------------------------|-----------------------------|-------------|--------------------|---------------------------|-------------|
| | Current Kwacha | 1980 Kwacha | | Current Kwacha | 1980 Kwacha |
| Chancellor | 2,681,120 | 1,621,972 | 980 | 2,735 | 1,655 |
| Bunda | 1,215,134 | 735,108 | 380 | 3,197 | 1,934 |
| Polytechnic | 1,278,202 | 773,262 | 507 | 2,521 | 1,525 |
| Kamuzu College of Nursing | 469,523 | 284,042 | 133 | 3,530 | 2,135 |



APPENDIX C

THE EDUCATION AND TRAINING PROGRAM

by Tom Westing

1. THE CURRICULUM

The diploma program at Bunda began in the 1966 academic year as a 3-year program. In 1969, a 5-year B.S. program was initiated. In 1975, the diploma and B.S. programs were combined into one track, with approximately the top 25 percent of the diploma graduates being admitted for an additional 2 years of study for the B.S. degree.

The 1975 curriculum revision provided for greater hands-on experience at the diploma and degree levels. In 1980, the curriculum was further strengthened by upgrading the amount and level of mathematics and basic science courses (e.g., biology and chemistry). This allowed the fourth- and fifth-year students to use more advanced scientific concepts and techniques in their specialty courses.

The curriculum is pyramidal in structure. The first 2 years provide a broad exposure to the agricultural disciplines; this is followed by a more specific focus during the fourth and fifth years. In the diploma program, 29 percent of the courses are basics (English, math, and science); 57 percent are formal agricultural courses; and 14 percent are farm work, agricultural tours, or farm projects. For the B.S. students, the breakdown is 29 percent for basics, 60 percent for agricultural courses, and 11 percent for various farm work and farm projects. There is more practical work than is reflected in these figures because many formal agricultural courses include lab components on crop production conducted at the student farm. Contact hours for lectures and practicals are shown in Table C-1.

2. AN OVERVIEW OF STUDENT AND CURRICULAR ACTIVITIES

On entering the diploma program, a student undergoes a week-long orientation program, which includes introductions to the faculty, staff, and administration and assignment of a faculty tutor (adviser). During the first year, students participate in 3 hours of farm practicals each week, which emphasize crop and livestock production. Farm practicals are performed in groups, which reduces the hands-on experience that each student receives. The scarcity of livestock and crop acreage also limits direct student experience in livestock and crop production.

Table C-1. Bunda College of Agriculture Diploma/Degree Combined Curriculum: Subjects and Contact Hours

| Department | Year 1 | | Year 2 | | Year 3 | | Year 4 | | Year 5 | |
|--------------------------|-------------------------------|-------|---|-------|--------------------------------|-------|----------------------------------|-------|--|-------|
| | Course | Hours | Course | Hours | Course | Hours | Course | Hours | Course | Hours |
| Basic Subjects | English | 90 | Statistics | 30 | | | Organic Chemistry | 60 | Technical Writing | 30 |
| | Mathematics | 90 | | | | | | | | |
| | Biology | 180 | | | | | | | | |
| | Chemistry | 120 | | | | | | | | |
| Agricultural Engineering | Shop Practice | 30 | Farm Mech. I | 80 | Soil Conservation | 30 | Farm Mech. II | 30 | Selected Agricultural Project ^a | |
| | Drawing | 30 | Surveying | 40 | Irrigation | 40 | | | | |
| | Farm Buildings | 30 | | | Farm Systems ^a | 30 | | | | |
| Crop Production | Farm Crop Practicums | 110 | Crop Husbandry | 60 | Plant Pathology | 40 | Plant Physiology | 50 | Plant Breeding | 70 |
| | | | Horticulture | 40 | Entomology | 40 | Soils of Malawi | 40 | Dis. & Pests of Malawian Crops | 50 |
| | | | Plant Propagation & Seed Technology | 40 | Weed Control | 40 | Stat. & Fld. Exp. | 60 | Soil Survey & Land Use | 40 |
| | | | Phys. Prop. of Soils | 40 | Soil Fertility & Fertilizers | 40 | Crop Practicum Supervision | 90 | Crop Physiology | 40 |
| | | | Chemical & Biological Properties of Soils | 40 | Farm Systems ^a | 30 | | | Selected Agricultural Project ^a | |
| | | | Pasture Crops | 40 | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Livestock Production | Types of Classes of Livestock | 50 | Livestock Practicums | 150 | Livestock Production for Women | 40 | Biochemistry | 120 | Animal Nutrition | 30 |
| | | | | | Farm Systems ^a | 30 | Anat. & Physiol. of Farm Animals | 40 | Animal Breeding | 30 |
| | | | | | | | Genetics | 30 | Livestock Proj. Support | 90 |
| Rural Development | | | Prin. of Ag. Econ. | 30 | Farm Management | 100 | Development Econ. | 30 | Technical Essays ^a | 30 |
| | | | Marketing | 30 | Personnel Support | 30 | Selected Topics | 10 | Exten. & Rural Soc. II | 80 |
| | | | Nut. & Public Health | 30 | Farm Systems ^a | 30 | | | Selected Agricultural Project ^a | |
| | | | | | Rural Sociology | 30 | | | | |
| | | | | | Exten. Methods | 120 | | | | |
| Home Economics | Home Econ. I | 100 | Home Econ. II | 270 | Home Econ. III | 140 | | | | |

^aShared by four departments.

The second year consists of a combination of basic and production courses, with lecture and laboratory components. The practicals, performed in groups of 10 students per section, can be conducted on the commercial farm. Toward the end of the second year, students are attached to an estate, an agricultural development division, or an agricultural research station for 4 weeks to participate in a variety of activities related to their specific crop and livestock production interests. The livestock attachments are normally carried out during the end of the summer vacation. Crop production attachments may be performed during the Christmas or Easter break, depending on the cropping season and farm operations. At the beginning of the third year, students write a group report highlighting their activities during the attachment.

The students receive a stipend from the College to cover food, lodging, and round-trip transportation for this attachment program. However, department heads expressed concern over the lack of supervision of students on attachments. Faculty coordinators are unable to make periodic visitations to assess the students' work because of funding constraints.

The third year is highlighted by more advanced production courses and more project-focused activities. During the first week of the third year, students take a week-long tour of research stations and commercial enterprises throughout the country. This trip is supervised and funded by Bunda College, and faculty representing the agricultural disciplines accompany the students. During the third year students are required to maintain a file on their activities related to agricultural production. Students meet 3 hours each week with a faculty adviser to discuss the week's activities; files are then collected by the coordinator of the program, evaluated, and submitted to the department head and dean for assessment. During the third year, students work 3 hours a week on a group project in the area of their main interest and then write individual reports on the nature and results of these activities.

Attachments in the third-year extension course provide considerable village-level experience for the students. Students are attached to a field assistant in one of five nearby extension planning areas. After observing the field assistant at work, the students take over part of the work, usually covering one or two blocks (areas within which farmers assemble for advice from extension agents). Students are in the field half a day each week for two of the three terms of the third year. This attachment provides students with extension service experience, making those who are later employed by the extension service to supervise field assistants more aware of their role (field assistants are trained at the Natural Resources College).

Approximately 25 percent of those receiving diplomas are selected to continue for a B.S. degree, which requires a fourth and fifth year of education at Bunda College. For the fourth and fifth year advanced courses, the faculty-student ratio changes measurably; as a result, there is greater opportunity for individual projects and individual interaction with faculty.

The fourth year is similar to the second year of the diploma program, but with an emphasis on food processing, preservation, and storage and on the microbiological aspects of plants and animals. Students select a project topic and make a preliminary oral report to the faculty at the end of the fourth year. If the topic is accepted by the faculty, the student conducts an individual project on that topic and submits a report on it in the fifth year in partial fulfillment of the B.S. requirements. Project topics are selected early, so students have sufficient time to complete research activities and analyses. Course work during the year has a more specific focus and makes use of the student's background in the basic sciences. The use and calibration of more sophisticated equipment in laboratory analysis are emphasized. To complete the degree program, the student submits and defends a project paper, which is then bound and kept in the library.

3. THE ROLE OF THE DEPARTMENTS

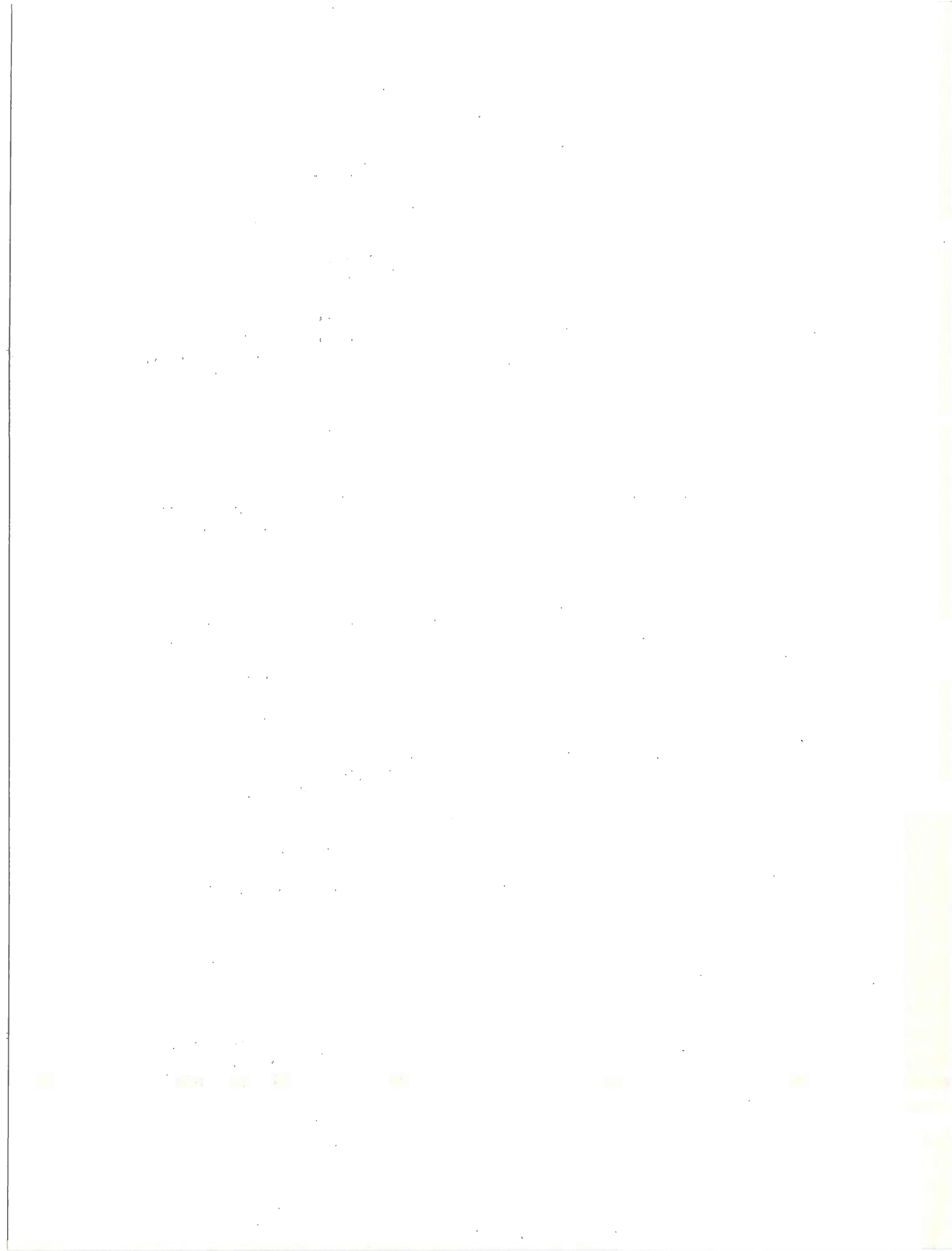
The six academic departments are responsible for teaching courses in their specific disciplines and in the relevant basic sciences; for example, the Animal Production Department faculty teach a biochemistry course; faculty in the Crop Production and Animal Production Departments cooperatively teach the biology course. Departments are also responsible for conducting activities in their discipline areas and providing faculty support for individual and group student projects and programs. During the second year, students elect a track in home economics or agricultural engineering; students selecting an agricultural engineering track do not take any courses in home economics and vice versa.

There is discussion of an options program in which departments would teach more in-depth courses in specific disciplines. During the second year, students would select an option and would have an opportunity to take approximately 25 to 30 percent of their course work in that specific area, with the remainder of their coursework being in agricultural "core" courses. Crop production would be emphasized, followed by livestock production, agricultural engineering, home economics, and rural development.

4. CLASSROOM AND LABORATORY TEACHING/PRACTICAL
WORK ON THE COLLEGE FARM

Classroom and laboratory facilities at the College are modest and functional. Because of budget constraints, funds for expendable supplies and equipment maintenance are very limited. Of particular concern is the College farm, with its limited scope and the lack of cooperation between faculty and the farm manager on the use of the farm for laboratory practicals. In 1976, the Bunda College farm--covering some 1,400 acres--reverted to a commercial enterprise directed by a farm manager who is responsible to the University of Malawi. The rationale was that student involvement with livestock and crops was lowering production and resulting in losses for the farm. Without regular access to the farm, student participation in the production disciplines necessary for the development of the required skills has been curtailed.

Students may use crops and livestock for laboratory activities, but active involvement in the farm is not permitted. Faculty are reluctant to request the use of the commercial farm because the students are blamed for the losses incurred by the farm. Despite limited student involvement since 1976, the farm has apparently continued to lose money.



APPENDIX D

CROP PRODUCTION DEPARTMENT

by Henry Foth

1. FACULTY AND COURSEWORK

The Crop Production Department has 14 faculty members in residence: 10 Malawians and 2 expatriates. Six have Ph.D. degrees, five have M.S. degrees, and three have B.S. degrees. An additional six faculty are on study leave overseas for advanced degree training.

The faculty of the Crop Production Department teaches the following four courses:

- Crop Production I (CP 201), which includes weather and agriculture, soils and fertilizers, and crop husbandry and crop protection (130 lecture and 100 practical hours per year)
- Crop Production II (CP 301), which includes seed technology; crop improvement; and field, plantation, pasture, horticultural, and vegetable crops (100 lecture and 40 practical hours per year)
- Crop Production III (CP 401), which covers soil science and crop physiology (70 lecture and 60 practical hours per year)
- Crop Production IV (CP 501), which covers farm mechanization, field engineering, and farm structures for irrigation and erosion control (70 lecture and 30 practical hours per year)

The 201 and 301 courses are in the diploma program and account for 28 percent of total instruction hours; the 401 and 501 courses are in the B.S. program and account for 31 percent of total hours.

The Department also teaches Agricultural Statistics 202 and 404 and cooperatively teaches Biology 103 and 402 with the Live-stock Department. In addition, the Department participates in Farm Practical Work Basic (BS 105), Farm Project (BS 301) and Individual Projects (BS 405). The BS 105 course involves learning practical agricultural skills including tillage methods and training of oxen. In BS 301, small groups of students work together on a special project. Similarly in BS 405, students

design and conduct a research project, write a report on the results, and make an oral presentation in an undergraduate seminar.

An inspection of course syllabi and practical materials showed good content. Supporting instructional material such as audiovisual equipment is available as needed. Laboratories and laboratory equipment are modest but adequate and well maintained. Students buy few textbooks or other books. Consequently, teachers hand out some material in class and assign library readings. Library reference texts include many well-known books published in Europe and the United States.

2. RESEARCH

Theoretically, 75 percent of staff time at Bunda is spent on teaching and 25 percent on research. Actually, research time is available mostly during the winter holiday vacation.

Several years ago, in response to a request from the College, the Ministry of Agriculture allowed Bunda to direct the research on one major crop for Malawi; Bunda selected beans (pulses). Later, the Collaborative Research Support Program (CRSP) of USAID/Malawi selected Bunda College as a site to support bean research in Africa. This program was vigorously managed by Dr. Edge (who has since left Bunda) and very recently has come under the able leadership of Dr. W. Msuku. The basic objectives of the CRSP research project are the following:

- Determining the source of variability (disease, drought resistance, nitrogen-fixation efficiency, and the like) of local bean varieties
- Determining how to optimize the use of local varieties, whether in mixtures or in monoculture, for the various locations and seasons in Malawi

Under the CRSP project, Mr. A.B.C. Mkandawire recently returned from Michigan State University, where he studied drought resistance and completed an M.S. degree. Under the same program Mr. J. Bokosi is currently working on a M.S. degree and conducting research on anthracnose resistance, and Mr. H.R. Mloza Banda is working on an M.S. degree, with nitrogen-fixation as the research topic. In a 1983 review of the Bunda program, Dr. Carl Eicher of Michigan State University concluded that "a promising research program on beans is underway."

The bean project under the CRSP in Malawi is being conducted on 30 varieties at five locations. Under sponsorship of the Program, one of Bunda's faculty, Dr. Eric Ayehs, is currently on

a 3-month postdoctoral program in the United States analyzing data collected during the project. The CRSP bean research project has also provided funds for some technical positions and for equipment and two greenhouses. Both greenhouses are currently fully used, and a temporary plastic greenhouse has been built and is also fully used.

It appears that more smallholder intercropping research is being conducted at Bunda College than elsewhere in Malawi. The work reported in the 1981-1983 and 1983-1984 research bulletins (see Bibliography) covers intercropping of maize-soybeans, wheat-peas, sorghum-beans, beans-groundnuts, and maize-cowpeas. Some of the current intercropping research projects visited by the team include the following:

- Maize and cowpea intercropping: maize is harvested first, followed by cowpeas at the end of the first and second years. At the end of the second year, the cowpea bushes are harvested for fuelwood. The cowpea bushes provide excellent protection from water erosion and add nitrogen equivalent to 70 to 80 kilograms per hectare the first year, and 30 to 40 in the second year.
- Groundnut and sorghum intercropping: to measure the effects of groundnuts on fields of sorghum and nitrogen fixation.
- Lab-lab (a tropical legume) and fallow: to measure nitrogen buildup and yields of succeeding crops.

Other research observed included experiments with three- and four-leaf bean plants, fertilizer rates and ratios, fertilizer response of the same crop on soils in different areas (Lilongwe vs. Kandiani), and wilt resistance of pigeon peas. Many genotypes for ICRISAT, an international research institute, are being evaluated for wilt resistance under Malawian conditions. There is effective collaboration with the nearby Chitedze Research Station for both research and student tours and with the Tobacco Research Station near Lilongwe. However, faculty have some difficulty, given their heavy teaching load, attending daytime meetings at Chitedze.

In summary, the current field research concerns soil fertility, crop improvement and diversification, and cropping systems. The Department's research philosophy is designed to pursue "a broadly based research program spread over several crops involving small but long-term projects as the best way in which to complement the undergraduate teaching program." This research program, which until recently was quite modest, has generated many publications. Over 35 papers were published

between 1965 and 1975 according to the National Register of Research Publications. Thirteen journal and seminar and/or workshop papers were produced during 1981 and 1982. Nine of the 13 papers published in the Bunda College Research Bulletin during 1983-1984 were from the Crop Production Department.

APPENDIX E

LIVESTOCK PRODUCTION DEPARTMENT

by Tom Westing

The Livestock Production Department has 12 faculty members: 8 have Ph.D. degrees, 3 have M.S. degrees, and 1 has a B.S. degree. Currently, one faculty member is on overseas study leave and another is an expatriate. The Department also employs 18 technicians to support the faculty. The annual teaching/research budget for the Livestock Production Department is 122,000 kwacha, or 26 percent of the total academic budget.

The Department offers four sequential livestock production courses--one each year--from the second year through the fifth-year of the B.S. degree program. Farm practicals in the first and third years devote approximately one-third of their time to livestock production. The livestock production offerings are integrated as follows:

- Farm Practical Work (BS 105). All first-year students take this course. Approximately 30 to 35 percent of the course emphasizes livestock production. This course stresses the application of practical skills to all aspects of agriculture. The livestock component specifically includes grades and types of livestock, evaluation, conformation, methods of handling, weight determination, and identification (180 practical hours per year).
- Livestock Production I (LP 201). Offered during the second year, the course covers topics in animal health and disease prevention, feeds and feeding, livestock improvement and mechanisms of heritability, artificial insemination, progeny testing, and selection techniques (70 hours of lecture and 80 hours of laboratory per year).
- Farm Business Management (LP 301). Offered the third year, this course introduces the management of poultry and swine; range management of beef, sheep, and goats; and dairy production, with a small section on aquaculture (80 hours of lecture and 90 hours of laboratory per year).
- Livestock Production III (LP 401). Offered the fourth year, this course emphasizes processing, preservation, and storage, primarily of meat and dairy products. The course covers conversion of muscle to meat, properties

of meat, factors affecting postmortem changes, the grades and cuts of meat, and preservation and processing. The dairy technology section emphasizes microorganisms and their classification, characteristics, and effects on milk products and quality. Some discussion is also devoted to the processing of fish and livestock by-products (40 hours of lecture and 40 hours of laboratory per year).

- Livestock Production IV (LP 501). Offered during the fifth year, this course covers animal nutrition and breeding. The animal nutrition section includes the evaluation and proximate analysis of feedstuffs to determine caloric content and the partitioning of energy into metabolizable energy for maintenance and production. Feeding standards related to reproduction and growth of all livestock are discussed. The animal breeding section covers methodology to improve performance, quantitative genetics, use of statistics in genetic evaluation, and seed stock for commercial production (40 hours of lecture and 60 hours of practical laboratory per year).
- Farm Project (BS 301). Offered during the third year, the farm project is designed to allow students to carry out a group project in agricultural production. Roughly 35 percent of this course is allotted to livestock production.

Faculty members in the Department also assist in team teaching of agricultural statistics, biology, chemistry, and biochemistry. The department held annual field days geared principally to smallholders, but these were discontinued in 1984 due to budgetary constraints.

Research responsibilities for the Livestock Department are focused primarily on swine, rabbits, and aquaculture. The following research projects are currently underway:

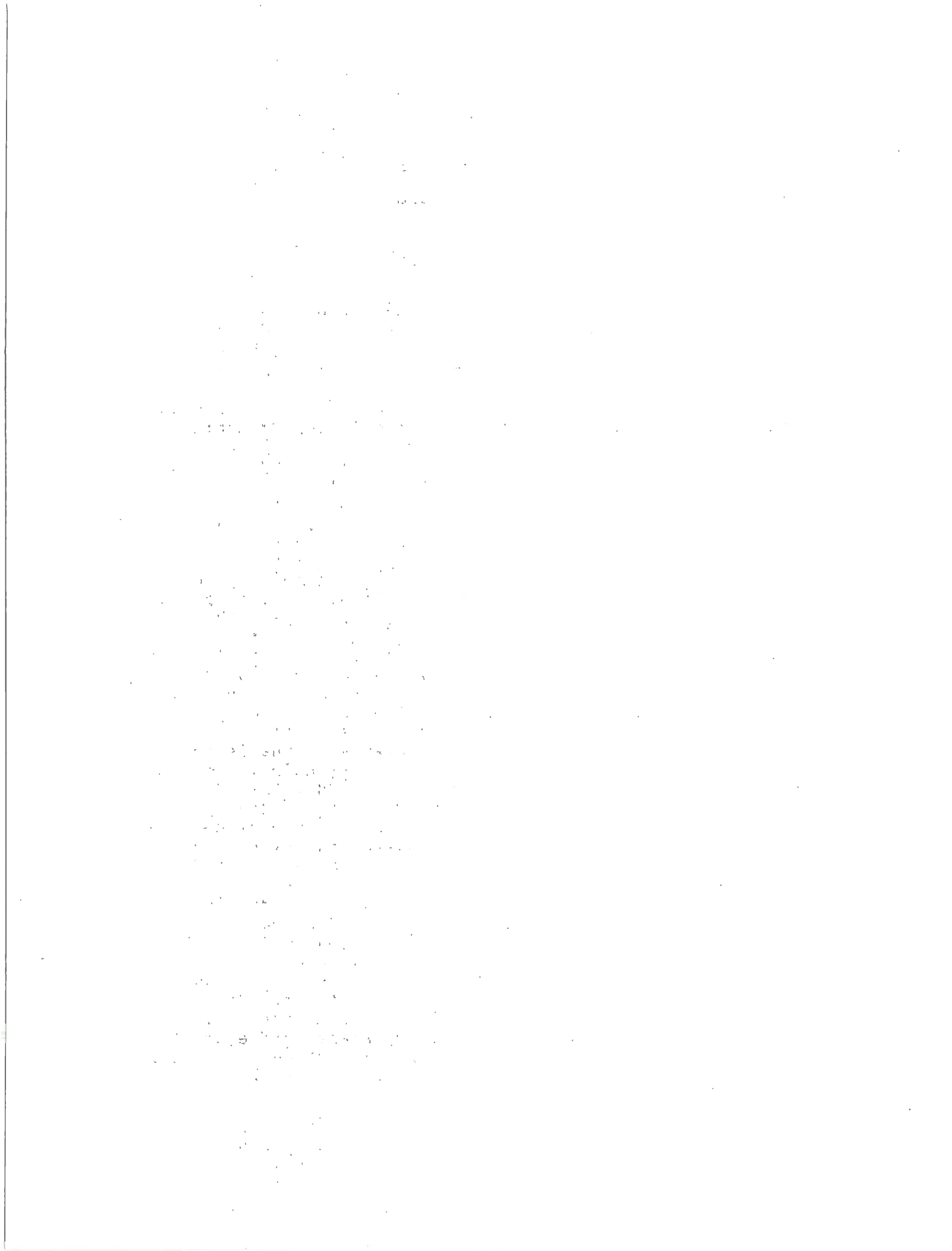
- Studies on the effect of bitter cassava on the growth and reproduction of pigs
- Evaluation of crop residues--maize stover, groundnut and bean hulls--as feed for goats
- Evaluation of various types of rabbit housing that could be used by smallholder farmers
- Evaluation of the effects of drying and temperature on protein quality in terms of available lysine

Recently initiated projects at the student farm include forage evaluation, stall feeding of fattening cattle, mineral profiles of forages, and the effects of sodium, chlorine, phosphorus, and copper on reproduction.

Considering that well over 75 percent of the faculty hold Ph.D. degrees, the Livestock Production Department possesses a strong cadre with the scientific expertise required to undertake significant research projects. However, because of the heavy teaching load, it is difficult for faculty to engage in a consistent research program. There is considerable interest in cooperating with the nearby agricultural research station at Chitedze; however, lack of supportive funding precludes such collaboration. In the absence of such research opportunities, the talents of the faculty will continue to remain underutilized.

Bunda College facilities to support livestock production are modest, yet practical and geared to the smallholder. The College farm and the faculty of the Animal Production Department should cooperate more effectively in using the facilities and the farm's livestock. Hands-on training is particularly important in providing students with the experiences needed in various livestock production practices and in the day-to-day management of a livestock enterprise. Livestock used in more active laboratory studies (e.g., castrating) must be purchased or raised on the student farm. When these livestock are sold, revenues are returned to a central fund, rather than to a revolving fund, so livestock cannot easily be replaced. This limits the number of livestock available for active laboratory procedures and reduces the amount of hands-on experience students can obtain in livestock production.

In summary, the Livestock Production Department has a strong and well-educated cadre of scientists with advanced degree training and an interest in teaching and research. Research activities are limited by the heavy teaching loads and severe budgetary constraints. A way must be found to support mutually beneficial cooperation between the faculty, the agricultural development divisions, and agriculture research stations through cooperative research activities.



APPENDIX F

RURAL DEVELOPMENT DEPARTMENT

by Jan Flora

1. FACULTY AND CURRICULUM

The Rural Development Department has seven faculty members: two extensionists/rural sociologists and five agricultural economists. Two have Ph.D. degrees and five have M.S. degrees (two are currently abroad completing their Ph.D. degrees).

Courses taught by the Department include four sequential courses in agricultural economics: Agricultural Economics (second and fourth years); Farm Business Management (third and fifth years); and Extension and Rural Sociology (second, third, and fourth years). In addition, Agricultural Systems and Rural Development I and II are taught in the third and fifth years. These two courses were begun as student seminars and have evolved into lecture and practicum courses shared by all the staff.

The sequence of courses in the Rural Development Department integrates sociological and extension concepts in the following fashion:

1. Second year. Courses expose students to basic concepts in sociology--norms, values, culture, leadership, and power--and how these concepts are manifested in rural areas. The courses also introduce the structure of the extension system in Malawi.

2. Third year. Courses provide greater emphasis on extension and on using sociology as a tool for extension. Courses cover program planning in extension; social surveys and basic sociological research methods (diploma students who opt for a project in rural development conduct a social survey); audio-visuals for extension; and group methods of disseminating extension information at the grassroots level in Malawi.

The third-year course for diploma students also includes student attachments in rural development for one-half day a week during two of the three terms of the third year. Students are attached to a field assistant in a surrounding extension planning area. Thus, they perform the activities of the position (field assistant) they would supervise should they go into the agricultural development division system upon securing their diploma. Six students are assigned to a field assistant, and each student covers one or two of the assistant's blocks. Each field assis-

tant has eight blocks, and a student visits one every fortnight--first under the assistant's supervision and then alone. The students are required to fill out the same forms as the field assistant, including credit applications, but instead of presenting them to the district officer, they present them to their instructors. At the conclusion of the field experience, the approximately 110 third-year students meet in assembly with the field assistants and district officers to analyze and criticize the experience in a free-wheeling discussion.

The attachment appears to be quite useful, and, unlike the attachments in crops and livestock, all students participate. However, it has the disadvantage of being carried out in the same area each year. Thus, the farmers begin to develop pat answers to the students' questions, and it is somewhat of a burden for the local extension personnel to host such a large number of students each year. If more money were available for transportation, the attachment areas could be rotated each year.

3. Fourth year. Courses emphasize supervision of extension workers and an examination of the processes of social change, using case studies of rural development projects (e.g., the Gezira scheme in Ethiopia, Ujama in Tanzania, and the Lilongwe Agricultural Development Program).

A review of the curriculum indicates adequate coverage of extension concepts, Malawi's extension system, and the Government's rural development programs. Given their importance, more attachments to the agricultural development division could be added during vacations. This would provide students with more intensive experiences and would allow them to work in regions outside the environs of Bunda. It would also allow potential employers and employees to get acquainted with each other.

There has always been a shortage of agricultural economics faculty at Bunda, and so student training in this area has been relatively modest. This situation will improve significantly next year with the return from overseas study of two faculty members with Ph.D.s in agricultural economics.

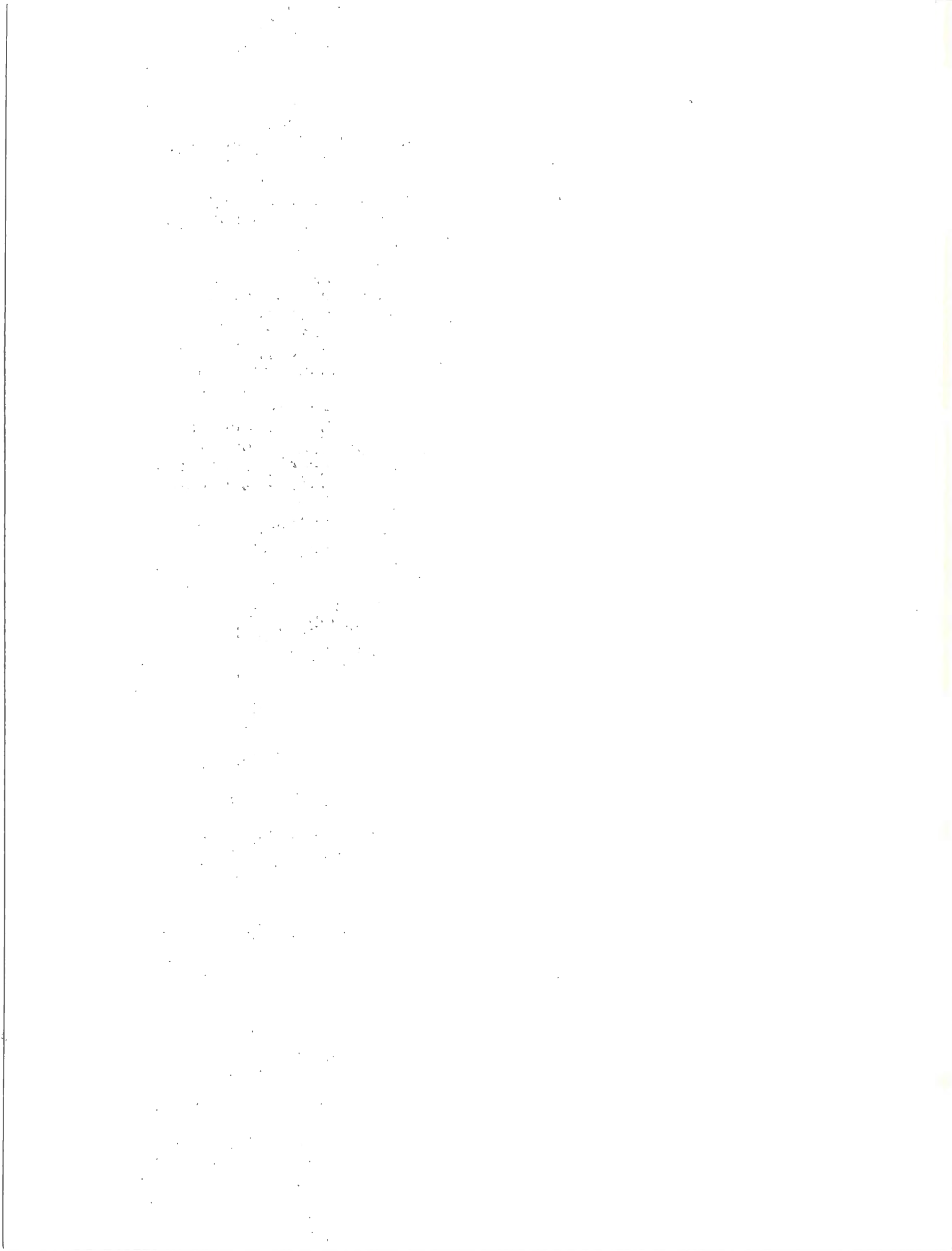
2. RESEARCH AND PROFESSIONAL DEVELOPMENT

The experiences of the student practicums led one professor to examine the relationship between the matrilocal system of residence and a willingness to invest in production-increasing technology. Because women own the land but men tend to be the decision-makers, there are potential problems. Although this work has not been published, its findings contribute to improved course content.

Two rural sociologists in the Department are collaborating with colleagues from Chancellor College (an economist and an agricultural economist) on a UNICEF-funded project being carried out for the Ministry of Community Services on rural women's income-generating activities. The study will examine women's roles in terms of reproduction and production, including division of labor, work load, time constraints, and access to and control over resources and markets. The results will help efforts by the Ministry to encourage nonagricultural income-generating projects by women on smallholder farms (Mkandawire and Chipande 1985).

The Rural Development Department and the Home Economics Department are hosting a workshop on "Rural Development Programmes and Agrarian Changes in Malawi: Experiences and Prospects." The seminar, funded by the Food and Agriculture Organization (FAO), will involve academicians and practitioners from all relevant institutions. There appears to be close cooperation between faculty from Bunda and Chancellor Colleges in this activity.

The faculty in the Rural Development Department do not have much time for research. This situation should improve with the return of the Ph.D. candidates on study leave. However, unless additional extensionist-rural sociologists are hired, there will be little time for research in rural sociology; each faculty member's teaching and supervision of attachments and projects is already a full-time job for two people.



APPENDIX G

FINDINGS FROM INTERVIEWS WITH BUNDA GRADUATES AND THEIR SUPERVISORS

by Jan Flora, Tom Westing, and Henry Foth

The team conducted individual interviews with 44 Bunda diploma and B.S. degree graduates and another 8 in a collective session at the Kasungu Agricultural Development Division (see Table G-1). Interviewees were employed in a range of institutions--from the Ministry of Agriculture (research, extension, the National Resources College, and autonomous subsidiaries) and the Ministry of Education to parastatal organizations such as the Agricultural Development and Marketing Corporation (ADMARC) and its subsidiaries to private firms (such as sugar estates). In addition, interviews were conducted with people who supervised former Bunda students. Often, particularly in the Ministry of Agriculture and its dependencies, these managers were themselves Bunda graduates. In addition to the organizations listed in Table G-1, the team interviewed Bunda-trained managers in the following organizations: the Kasungu Flue-Cured Tobacco Authority (autonomous dependency of the Ministry of Agriculture) and Press Farming Limited and General Farming Company Limited (both part of the Press Group of for-profit enterprises). Nearly 30 supervisors of Bunda graduates were interviewed. Some of our observations and impressions are presented below.

1. SATISFACTION WITH BUNDA TRAINING

Both the employers and graduates interviewed had a high regard for the general agricultural training provided at Bunda College. Graduates were particularly positive about the practical orientation of training. While most students were positive about their individual projects, they were sometimes less enthusiastic about group projects, particularly the agronomy practicum in the first year.

2. VIEWS ON THE CONTENT OF THE BUNDA TRAINING PROGRAM

When asked what areas or subjects they wished the College would emphasize more, former Bunda students generally cited areas relevant to their current job. For example, those in extension were particularly concerned about the limited training in management skills and financial management at Bunda. Administrators of agricultural development divisions also thought

Table G-1. Characteristics of Bunda College Graduates Interviewed

| Employer | Diploma Graduate | B.S. Degree | Background | | Male | Female |
|---|------------------|-------------|-------------|---------------------------------|------|--------|
| | | | Smallholder | Parent(s) Worked Off Farm | | |
| Mzuzu ADD | 2 | 3 | 4 | 1 | 4 | 1 |
| Lilongwe ADD | 2 | 0 | 2 | - | 2 | - |
| Kasungu ADD | - | 8 | | | 6 | 2 |
| Kasungu ADD | 3 | | | | 3 | 0 |
| Blantyre ADD | | 2 | | 2 | 1 | 1 |
| Salima ADD | 1 | | 1 | | 0 | 1 |
| Chitedze Exp. Station | 1 | 3 | 2 | 1 | 2 | 2 |
| Bvumbwe Exp. Station | 1 | 1 | 1 | 0 | 2 | - |
| Kasinthula Exp. Station | 1 | 0 | 1 | 0 | 1 | 0 |
| Smallholder Sugar Authority | 0 | 0 | - | - | - | - |
| Smallholder Tea Authority | 0 | 1 | 1 | 0 | 1 | 0 |
| Mitundu Secondary School | | 1 | | 1 | | 1 |
| ADMARC, Central Administration | | 1 | | | 1 | 0 |
| Natural Resources College (MOA) | | 2 | 2 | | 2 | |
| Mikolongwe Veterinary Station | 4 | | 2 | 2 | 4 | |
| Dzalanyama Ranch (MOA) | 1 | | 1 | | 1 | |
| Dept. Veterinary Services (MOA) | 1 | | | | 1 | |
| Malawi-Canada Dairy Cattle Project | 1 | | 1 | | 1 | |
| General Grain & Milling, ADMARC | 2 | | 2 | | 2 | |
| Dwangā Sugar Estate | 3 | 2 | 4 | 1 | 5 | 0 |
| Sugar Corporation of Malawi | 3 | 0 | 3 | 0 | 3 | 0 |
| Tea Research Foundation of Central Africa | 1 | 1 | 1 | 1 | 2 | 0 |
| Total | 27 | 25 | 28 | 9 | 44 | 8 |

that these skills should receive more emphasis at Bunda. Those in agricultural research desired more analytic training. Those at the research stations believed that animal production needed more emphasis; two administrators mentioned that adaptive research concepts needed to be integrated into the Bunda curriculum. One suggested establishment of a course on farming systems research.

In general, people thought their training in agronomy was good. A few thought that agronomy was overemphasized at the expense of other departments. Some students commented favorably on the rural development attachment projects (weekly observation of the interaction between farmers and extension workers and participation in the work of extension field assistants).

Regarding Bunda's program in home economics, women interviewees expressed a general concern that the training program was not practical enough. Home economics seems to have been plagued even more than other areas with the lack of continuity in faculty, which has resulted in a high proportion of short-term expatriate teachers teaching their specialty rather than the broader curriculum. One respondent commented that it is difficult to build a core faculty in home economics because women generally follow their husbands. Lack of faculty continuity is aggravated by Bunda's isolated location.

3. IS THE BUNDA GENERAL AGRICULTURAL PROGRAM SATISFACTORY?

Employers generally agreed that Bunda graduates are well prepared as general agriculturalists and that they have the ability to learn on the job. Employers in the tea and sugar industries, for example, may have positions that require much specialized knowledge, which the graduates lack. However, in their view, Bunda graduates have a good general background, and employers realize that Bunda College cannot train just a few specialized persons to fill their needs. Thus, they do not consider the lack of specialized training a serious handicap.

Generally, former Bunda students approved of the general agricultural curriculum. Nearly all suggested areas in which they might have specialized had they known the kind of jobs they would subsequently secure. Most believed that, except for a few subject matter specialists at the agricultural development division level, specialized degrees would be inappropriate. Nonetheless, a clear majority of those with B.S. degrees believed there should be an opportunity to choose options beginning in the third or fourth year. Those with diplomas opposed options at the diploma level.

4. MAKING SPECIALISTS OF THE BUNDA GENERALISTS ON THE JOB

Employees and former Bunda students recognized the need for additional training of the agricultural generalist from Bunda. Private firms were more likely to have a definite plan of in-service training than were public sector agencies. An exception is the medium-size tobacco estates, which cannot afford to individually train their managers.

Persons with degrees from Bunda College who go to work in the extension system ordinarily begin with an administrative post at the rural development project level before becoming subject matter specialists at the agricultural development division level. Program managers try to send those who become subject matter specialists at the division level for additional training--often overseas--before the specialists assume their posts. Subject matter specialists at the project level who are technical officers (diploma graduates) will not generally receive special training in their subject matter area. They learn through informal apprenticeship or on-the-job experience. However, the Lilongwe Agriculture Development Division has an in-service training center in four of the five rural development projects, and it is staffed by more experienced division-level subject matter specialists.

Special training is sometimes necessary in areas in which Bunda provides no training. For example, the Lilongwe Agricultural Development Division provides a special 3-week course in oxen-oriented mechanization at the National Resources College because Bunda students learn more about mechanized agriculture than they do about work with oxen. Similarly, when a Bunda graduate signs on as a secondary school teacher with the Ministry of Education, an additional year of training is provided at the University of Malawi in specialized educational courses.

At the research stations, people with B.S. degrees are generally sent for postgraduate training overseas as soon as external financing is available. No special training seems to be provided to technical officers who work as laboratory assistants (persons with diplomas). The most common form of training for this group is to send them back to Bunda for B.S. degrees. This has resulted, in the case of Chitedze Research Station, in a larger number of professional officers than technical officers, although in theory each professional officer should have an average of two laboratory assistants.

When a diploma graduate joins a sugar estate as a field assistant, on-the-job training is provided. After 1 or 2 years, the graduate may be sent for a series of short courses, such as the following, interspaced with work periods:

- A short course in South Africa on sugar cane management in the summer season
- A similar course on sugar cane management in the winter season
- The "Management Today" course at Mananga in Swaziland on management of personnel and resources

Over a period of 8 to 10 years the field assistant is likely to advance to assistant section manager and then to section manager, eventually joining the senior staff as an area manager in charge of sugar cane production on 5,000 acres. A B.S. graduate may follow a similar path but end up as an estate agronomist.

Bunda College graduates tend to stay with their first or second employer. In the estate sector the jobs are very specialized, and once a person is trained, job opportunities may become limited. Thus, someone who has worked 5 or more years on a sugar estate becomes known as a "sugar man," and the estate is anxious to retain the employee because of the time and money invested in training. Many graduates, particularly those from the north, work in the districts where they were born because of strong extended family ties. These are important forces that tend to limit job mobility.

5. THE FEMALE AGRICULTURALIST IN MALAWI

Training at Bunda College is much less gender stereotyped than a few years ago. Women were admitted to the diploma program during Bunda's second year of operation, and the first eight women received their diplomas in 1971. It was not until 1974 that a woman was admitted to the Bachelor's program, and the first one graduated in 1977. Since enrollment expansion in the late 1970s, approximately 20 percent of the diploma graduates and 15 percent of the B.S. graduates have been women.

In the second year at Bunda, a student must choose between home economics and agricultural engineering. In the past, women either chose or were slotted into home economics. Recently, women have been told that they have a real choice between agricultural engineering and home economics. There are currently four female diploma students in agricultural engineering and two men who are taking home economics.

Employment opportunities for female graduates of Bunda are more restricted than they are for male graduates. The private sector rarely hires female graduates for technical and managerial positions. One estate manager said it would be difficult for women to oversee farm laborers because there is a cultural bias against women giving orders.

In the public sector the Ministry of Agriculture and Ministry of Education are the primary employers of female graduates from Bunda. The first female professional officer entered the Department of Agricultural Development, the extension arm of the Ministry of Agriculture, in 1977, the year the first woman graduated from Bunda. Within the Department of Agricultural Development there are currently 19 women professional officers, a position requiring a B.S. degree. Fifteen of these women obtained their degrees from Bunda, and another received her diploma from Bunda and her degree in Great Britain.

Of the 19 women in extension, 11 are division-level subject matter specialists and 1 is a senior agricultural officer (direct supervisor of subject matter specialists at the agricultural development division level). Five are in the Department of Agricultural Development headquarters, as either the head or assistant head of a section. Two are teaching extension at the Natural Resources College. These women are working in training (7), women's programs (5), extension administration (2), foods and nutrition (2), farm management (1), and credit supervision (1).

The 15 women in the Department of Agricultural Development represent nearly half the women who have a B.S. degree from Bunda (as of 1984, 32 had graduated). Three additional female Bunda graduates are researchers at Chitedze Research Station. One female Bunda B.S. graduate and two women with diplomas from Bunda College are on Bunda's faculty in the Home Economics Department. One female Bunda graduate is head of the Ministry of Education's section for agricultural teaching in secondary schools, and most of the remainder of female Bunda graduates are probably teaching agriculture in secondary schools.

Women represent a distinct minority in most areas within extension. Four of the 26 principals (heads) of Residential Training Centers located at the rural development project level are women; a scant handful of women are credit officers at that level. Only one district officer (head of an extension planning area), out of 200, is a woman. This condition is attributed to the fact that married women go where their husbands go and to the fact that women do not like the hardship conditions associated with grassroots extension work. Fewer than 5 percent of field assistants (technical assistants at the grassroots agricultural level) are women, and only one-quarter to one-fifth that number are farm home assistants--the grassroots home economists trained at the Natural Resources College. Thus, as one goes down the scale of the extension system, women hold fewer agricultural posts or are more likely to be channeled into traditional female roles, such as home economics jobs.

The most important reason for the limited number of women in agricultural service positions is the small number of women being trained in this area. There are few women being trained in agricultural services because of the following reasons:

- Girls are less likely to attend school. In the last population census in 1977, only 62.5 percent as many girls as boys aged 5-24 years were in school. The ratio declined from 91 percent for the 5-9 year-old age group to 12 percent in the 20-24 year-old age group, indicating that girls are much more likely to drop out of school (Malawi's Population Census, vol. I, 1984; 128). Girls in the countryside have a larger economic role than boys and are therefore less likely to remain in school.
- The girls who remain in school are disproportionately from the villages, towns, and cities rather than remote rural areas. Partly because of this, girls finishing high school are unlikely to opt for agriculture as a college career. This was reflected in interviews with former Bunda students. The majority of men interviewed were from smallholder families, while women were more likely to be from villages and to have a parent with an off-farm job. Bunda was the first choice for most of the men but not for most of the women, although they were now generally happy with their agricultural careers. A high school teacher of agriculture believed that things might change now that a significant number of high school agriculture teachers are women. This may influence their female students' career choices.

A number of interviewees indicated that the awareness of the importance of women in agriculture and of having more women in the Ministry of Agriculture is greater the higher one goes in the Ministry. The lack of recognition of women's roles by men at the lower levels of the extension service, combined with college-educated women's reluctance to live in remote rural areas (due partly to their more "urban" background), means that there is little contact between female extension workers and farmers. This is a national problem because (1) women do the majority of the farm work (although men make most of the decisions--or they are made jointly with women) (Hirschmann and Vaughan 1984), and (2) women head nearly 30 percent of the farm households. For cultural reasons, it is more difficult for male extension workers to relate to female farmers than is true for female extension workers. Thus there is an imperative need for female agricultural extension workers (especially at the field assistant-level, but also at the district officer and credit supervisor levels).

Because of the shortage of female extension workers, in all agricultural development divisions there is a staff position for a woman program officer who is assigned to sensitize male extension workers to the problems of female farmers. The Department of Agricultural Development has put out an extension bulletin on "Reaching Female Farmers through Male Extension Workers" (1983). Extension workers are encouraged to organize separate women farmers clubs to encourage women to seek credit and extension information. (In the Lilongwe Agricultural Development Division, only 8 percent of credit recipients are women [Hirschmann 1984, 30]). One female diploma graduate interviewed by a member of the team was an assistant credit officer in an agricultural development division where it was customary for credit to be given to the men. Working closely with the woman program officer, she has significantly expanded the number of women receiving credit in that division.

6. EMPLOYABILITY OF BUNDA GRADUATES

In the 1970s, most Bunda graduates had multiple job offers. However, in recent years, with the decline in growth in both the public and private sectors, there has been a corresponding shrinking of the job market for trained agriculturalists. In interviews with employers in the public sector--particularly in the agricultural development divisions--a sharp decline was indicated in the demand for professional officers and technical officers. A similar downward trend was recorded from private sector employers. The team also heard of Bunda graduates being on the job market 6 months or more before finding employment. The interviewers found a few cases of underemployment--people who reported that they were performing jobs in which they felt the skills and knowledge gained at Bunda were not being utilized.

7. POLICY SUGGESTIONS

The following policy suggestions for Bunda College are derived from interviews with employers and former Bunda students.

1. The general degree in agriculture should be maintained at Bunda, particularly in light of the effort by the Ministry of Agriculture to introduce adaptive research into its extension and research programs. However, it may be appropriate to allow for options at the B.S. level. Diploma graduates were satisfied with the general program, whereas B.S. graduates tended to favor some degree of concentration in the last 2 years.

2. Options within a general agricultural course should be established only if the students know what their interests are and have some likelihood of being employed in that area. This suggests that vacation employment for Bunda students at agriculturally related institutions (6-week to 2-month internships in which students receive a modest salary from the employer) should be a high priority. Likewise, consideration should be given to expanding the university-funded attachments to include selected employers for students doing a diploma-level project in crops or livestock. The attachments for crops (usually in tobacco or horticulture) take place during the Christmas and Easter vacations during the students' third year and between the second and third years for students doing a livestock project (at the Mikolongwe ranch or on ADMARC livestock estates). Appropriate attachments should be devised for students doing projects in agricultural engineering, rural development, and home economics.

Expansion of summer employment and attachments would require (1) an increase in the University of Malawi budget for attachments; (2) a more aggressive effort by Bunda College to place students in vacation employment, which would also link Bunda more closely to the public and private employers of its graduates and would facilitate feedback on curriculum and other Bunda policies; and (3) changes in the policies of the Ministry of Agriculture so that more money is available for hiring students for vacation employment. With the stabilization of the Ministry of Agriculture's personnel requirements, the Ministry could provide greater resources for student vacation employment under the assumption that the probability would be high of hiring the students when they graduate. This means that in essence the recruitment process would begin earlier.

3. Retention of the general agricultural degree is compatible with Bunda's initiation of continuing education or in-service training courses for selected groups of employees of the Ministry of Agriculture, the Ministry of Education (agriculture teachers in secondary schools), the Ministry of Forestry and Natural Resources, and for certain elements of the private sector. Such training courses, which would have to be conducted during the vacation period, will require greater contact between Bunda College administrators and employers of their graduates. It will also necessitate greater flexibility on the part of employers in providing the financial resources for such courses.

Bunda College might devise a mechanism similar to that used by the Center for Social Research of the University of Malawi. The employer benefiting from the courses would cover all variable costs, including salaries of professional staff. The instructors would receive a salary supplement equal to one-half

of the salary budgeted by the employer. The other half could go into a center for agricultural research at Bunda, with funds made available to faculty on a competitive basis. This money could be used by faculty for preparing grant applications to outside funding agencies through the Center, thereby strengthening the research capability of the College.

APPENDIX H

THE FUTURE OF BUNDA COLLEGE

by Gary Hansen

1. REDEFINING BUNDA'S MISSION

The future of Bunda College will need to be different from its past. Social and economic conditions are changing in Malawi, and Bunda should be encouraged and supported in adapting and utilizing its resources to reflect these changes.

During the past 20 years, Bunda has admirably fulfilled its primary mission as a diploma/degree teaching institution, thereby providing the critical mass of trained manpower required in a new developing country. However, it cannot continue to confine itself to this role. Most of the employers interviewed by the team, whether in the public or private sector, indicated that unlike the 1970s, when large numbers of Bunda's graduates were in demand, employers in the 1980s will have few new positions for Bunda's graduates. A recent manpower study indicates that over the next 5 years the Ministry of Agriculture will need to recruit an average of 20 diploma graduates and 12 B.S. graduates a year. However, Bunda is currently producing around 90 diploma graduates and 30 B.S. graduates a year. The team heard of several recent diploma and B.S. graduates who had to wait 6 to 12 months before securing employment.

It is apparent that the job market for Bunda students is becoming more attenuated and will likely remain so for most of the 1980s. This suggests that Bunda should redefine its mission by moving away from being primarily a diploma/degree-granting teaching institution to becoming an institution in which such teaching is strongly complemented by research, outreach, and in-service training programs. This broader concept of Bunda's role is needed not only because of an apparent impending saturation in Malawi's job market, but also because the number and level of training of Bunda's faculty will soon reach a point where research, outreach, and in-service training will need to become an essential feature of their professional pursuits. In 1985, Bunda had 16 Ph.D.'s on the faculty, and within the next few years that number will rise to 24. This will be by far the largest institutional aggregation of high-level agricultural scientists in Malawi.

For the next decade or more Bunda College will be Malawi's institute of highest professional standing in the agricultural sciences; therefore, confining its Ph.D. faculty to a purely

teaching role would be an unfortunate misuse of such a scarce national resource. A major comparative advantage of having people with Ph.D. degrees, at least for the agricultural sciences, is the capacity to produce and disseminate research relevant to the needs of the agricultural sector. It would seem essential therefore that Bunda faculty become more directly engaged in fostering the advancement of agricultural research in Malawi. Indeed, the same conclusion was put forward by the United Nations Development Program (UNDP)/Food and Agriculture Organization (FAO) in the recent assessment of its assistance to Bunda.

The administrative structure [of the University of Malawi] should support and give recognition to faculty performance in all three areas of responsibility--teaching, research, and outreach--and not in teaching alone, as would be appropriate in a purely teaching institution (UNDP 1985).

Aside from the imperative for expanding Bunda's research role, the need for in-service training within the Ministry of Agriculture will become particularly acute as many of their staff, who graduated from Bunda 5 or 10 years ago, require further short-term training. These individuals, approaching mid-career, need to update the knowledge they learned 10 years ago and advance with the current state-of-the-art in the agricultural sciences. Bunda is a natural choice for addressing some of these needs; the College can offer short courses in areas where there is a need for specialized upgrading of Ministry of Agriculture staff.

2. A BRIEF COMMENT ON THE DESIRABILITY OF INITIATING A POSTGRADUATE DEGREE PROGRAM AT BUNDA

In recent years discussions have been underway at Bunda and the University of Malawi on initiating a master's degree program in the agricultural sciences. This desire reflects a growing and genuine need for more advanced training among Malawi's agriculturalists. However, at this point in Malawi's development, the argument could be advanced that it would be more cost-effective to send candidates abroad for M.S. training, thereby reducing the possibility of further overextending scarce Ph.D. faculty resources in a heavier teaching load and allowing them to push ahead in generating research for Malawi's agriculture sector.

In brief, it would seem that overseas training is less expensive and easier to secure from overseas donors than is support for the development of research relevant to Malawi's needs. Given the scarcity of high-level scientific manpower in

the Ministry of Agriculture Department of Agricultural Research, it is apparent that Bunda's faculty will need to become more involved in supporting the Department's research program, but this can only be done if the faculty is protected from an excessively heavy teaching load. It is not clear whether this could be accomplished if Bunda, with its current faculty numbers, were to establish an M.S. program.

3. THE NEED FOR NEW INSTITUTIONAL ARRANGEMENTS

Major readjustments in current institutional arrangements will be required if Bunda is to move from a teaching to a multi-functional college. As it now stands Bunda is not connected institutionally with the Government agencies and major private enterprises that are most active in the development of the agriculture sector. There is interaction of some individual faculty members with individual staff in the Ministry of Agriculture, but there is no formalized linkage between Bunda and the Ministry. Bunda is represented on the National Agricultural Research Council, but this high-level body meets infrequently and has no vital and continuous connection with Bunda's larger institutional interests.

Bunda is highly regarded by Ministry of Agriculture staff, and there is a recognized need for collaboration between the Ministry and Bunda. Bunda faculty share the same view, but there is no institutional mechanism to facilitate sustained interaction and support. As a constituent member of the University of Malawi, Bunda remains under the exclusive authority of the University and the Ministry of Education. Understandably, the Ministry of Education has more interest in the generic features of the educational process than in the particular substantive concerns of the agriculture sector. It is therefore easy to overlook Bunda's distinctive mission as an agricultural college. The UNDP assessment makes note of this problem in the context of the University of Malawi.

Its [University of Malawi] institutional structure is most appropriate for a liberal arts or science college but less appropriate for an agricultural college because it carries out only limited applied agricultural research and has no responsibilities for an extension program. These activities are essential for an agricultural college and require special support, but this is not yet available at Bunda. (UNDP 1985, 22).

Consequently, Bunda remains a college without a constituency--it has no institutional linkage with critical centers of support for agricultural education and research. As the primary

employer of its students, the Ministry of Agriculture remains the most logical source of support for Bunda, but under current administrative and budgetary arrangements it appears difficult, if not impossible, for the Ministry to undertake this role. Indeed, without a mandate to exercise some policy control over Bunda, there is little incentive for the Ministry of Agriculture to allocate resources, as part of a routine budgetary item, to support Bunda's larger involvement in agricultural research and extension. In striking contrast, the Ministry of Agriculture has authority over the Natural Resources College and thus is vitally involved with its program and students.

There is a range of institutional measures that could be adopted to end Bunda's isolation. In some countries, agricultural colleges are directly under the ministry of agriculture, with some formal links to the ministry of education for maintaining professional and academic standards. In other countries, agricultural colleges are directly under the ministry of finance. Because the finance ministry evaluates budget requests on the basis of national development priorities, the role of the agricultural college in contributing to agricultural research would usually be given greater weight in national resource allocations under this institutional arrangement.

Ultimately, a solution to Bunda's role and linkage to the larger institutional arena will need to reflect what is appropriate for conditions in Malawi. Without a fundamental revision in these institutional relationships, the future contribution of the College to Malawi's development will be seriously constrained. As the UNDP report notes:

The existing agricultural research and extension programmes in Malawi would benefit from stronger links between the University and the Ministries that are the prime users of the Bunda product, mainly the Ministries of Agriculture and Natural Resources....

One way to strengthen such links would be to coordinate research projects and outreach activities with the research and extension services of the government (UNDP 1985, 23).

Such coordination will only occur when the appropriate institutional mechanisms are in place. Until such mechanisms are in place, Bunda's potential will not be realized and the talents of its growing faculty will remain underutilized. If the proper institutional linkages can be arranged, then Bunda should rise to a position of leadership and become a major partner in Malawi's agricultural future.

APPENDIX I

NOTES ON AUTHORS

Dr. Delane Welsch is Director of International Programs, Institute of Agriculture, Forestry, and Home Economics and is concurrently Assistant Dean for International Agricultural Programs of the College of Agriculture, University of Minnesota. Dr. Welsch received his Ph.D. degree in agricultural economics from Michigan State University. For 9 years he served with the Rockefeller Foundation on the faculties at Kasetsart University and Thammasat University in Thailand and as an adviser to the Thailand Ministry of Agriculture. Dr. Welsch has authored numerous journal articles and research reports in the areas of farm management, production economics, agricultural development, and farming systems research. He has engaged in a wide range of consultancy assignments in Africa, Asia, and Latin America.

Dr. Henry Foth is Professor of soil science at Michigan State University. He received his Ph.D. degree in soil science from Iowa State University. Dr. Foth has served as a consultant to Argentina in the area of agricultural education and for 2 years was the resident plant science adviser to the University of Nepal College of Agriculture. He has authored numerous journal articles in the areas of soil genesis, fertility, and tillage, and he has published two widely used college textbooks on soil science and soil geography. He has also developed an earth science course for secondary schools, which is used throughout the United States and in some foreign countries.

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