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AGRICULTURAL EMPLOYMENT DEMAND

AND PROPOSED

U N I S W A RESPONSE

PREPARED FOR U.S. A.I.D.

Mbabane, SWAZILAND

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PREFACE

This report is prepared for the United States Agency for International Development Mission in Mbabane in response to a Consultancy Request for the Faculty of Agriculture by the University of Swaziland.

The U.S. consultant, Professor Robert E. McCorkle, arrived in country July 15, 1987, and immediately met with the Dean and Faculty of Agriculture, Luyengo campus, and with the Acting Vice-Chancellor of the University and appropriate officials of the Ministries of Agriculture and Education

A Consultant Team was formed by adding two UNISWA faculty members.

Barnabas M. Dlamini, Ph.D.
Lecturer in Agricultural Education
and
Mrs. Vakashile Simelane
Lecturer in Social Science

The Team, in consultation with the Faculty of Agriculture, prepared an "Industry Survey" instrument and then researched the prospective demand for agricultural diplomates/graduates among all types of employers, private sector, parastatal, and government.

Included in the survey were a variety of questions developed with the specific purpose of discovering the desirable skills that employers felt the students should possess as they were hired into their workforce.

The results of the survey were presented to a meeting of Private Industry, Government and University representatives at the Luyengo campus on August 26. Recommendations for curriculum adjustments were presented to the Faculty of Agriculture on August 28.

The complete report follows.

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Terms of Reference

A. Title

Terms of Reference for Agricultural employment demand projections proposed curriculum changes, and necessary infrastructure support at UNISWA, Faculty of Agriculture Luyengo.

B. Background

The University of Basutoland, Bechuanaland and Swaziland (UBBS) opened in 1964. In 1966, on the independence of Botswana and Lesotho it became the UBLS (University of Botswana, Lesotho and Swaziland). By 1982, each campus was a free-standing, national university. As with most agricultural in developing countries, initial emphasis was placed on preparing students for government (administrative) jobs in the Ministry of Agriculture, Natural Resources, etc. As the limited demand for such candidates was met, the program shifted its focus to more technical training for extension workers. Very quickly this market has also been satiated. As the faculty of agriculture looks ahead and speculates about the market/demand for their graduates, they are increasingly talking about jobs in the private sector (Agri-industries, agricultural processing, marketing, etc.) and self-employment (as commercial farmers, providers of farm services, etc.). Adjustment to such a shift in focus will necessitate relative shifts in curriculum, additional technical expertise and, possibly physical facilities.

As often seems to be the case, the agricultural training appears to be largely theoretical with only occasional excursions to the agricultural farm. The technical and production aspects of the training are not obviously tied to reality through association to costs, returns, etc. Ideally, the university should be providing students with the requisite skills to ensure productive employment, either in industry or for self. Besides practical skills, the curriculum must also attempt to incorporate the work ethnic and business/profit motive of private enterprise. Agricultural training, as Mission envisions, may require approaching work on the farm almost as engineers at some schools approach a cooperative education program (technical training interspered with hands-on practical experience). If this seems appropriate, such training must include principles of agricultural business, including management for cost containment,

evaluation of marginal returns, familiarity with at least elementary market analysis, etc. as well as production technology. The university appears to be considering a five year program. The Contractor may be able to provide assistance to UNISWA in structuring this program to accommodate full-time work in farming or related industry.

C. Scope of Work

The objective of this study is to assist UNISWA, (1) by preparing demand projections regarding employment opportunities for their agricultural diplomats/graduates, (2) by proposing adjustments to the present curriculum and facilities which would help the faculty of agriculture be more responsive to the market demand and requirements for its diplomats/graduates and (3) by preparing a blueprint for re-organizing the faculty, curriculum and facilities to accomplish the objectives identified by UNISWA. This action documents will identify and develop the potential role for donors in assisting UNISWA in the implementation of its objectives and the recommendations made by the Contractor. The Contractor, in his professional capacity, may expand his recommendations beyond the confies of this sow, as time permits.

D. Farm Facilities

The Contractor will evaluate the farm facilities for their appropriateness and shortcomings, if any, relative to the changes in curriculum being proposed and make recommendations for changes or modifications to support the proposed curriculum.

E. Personnel

The Contractor will be a senior agricultural educator with experience in developing countries, preferably with agricultural colleges. He will have demonstrated experience in estimating demand (preferably) for agricultural graduates). curriculum development and facilities appraisal and a strong business/management orientation.

The local (Swazi) consultants may be either research assistants, faculty members or independent consultants with the relevant skills and training. Though their identification and employment will be the responsibility of the Contractor, UNISWA will endeavor to identify potential candidates and prepare a "shortlist" prior to the Contractor's arrival.

The Contractor and the local consultants will work together during the development of the survey questionnaire, with the interviewing and on the analysis of the data collected. The Contractor will draft and sign an agreement with each local consultant outlining the amount, period and scope of work.

AGRICULTURE

According to Swaziland - A Businessman's Profile produced by Barclay's Bank, agriculture continues to play a significant role in Swaziland's economy because it is the most important economic sector. Agriculture directly contributed 25.3 percent of the Gross Domestic Product (GDP) in 1983. Next in importance is manufacturing, which contributed 23.5 percent to the GDP. Almost one-half of the manufacturing sector is represented by processing of agricultural and forest products, emphasizing even more the importance of the agricultural sector in the economy.

Of the estimated 78,609 employed in the formal sector, 31 percent were employed in agriculture/forestry and 14 percent were employed in manufacturing, including again an addition of one-half of the manpower involved with processing of agricultural and forestry products, bringing the formal sector employment estimate in agriculture and closely related industries to about 33,000 today.

There are two distinct sub-sectors within the Agricultural Sector. The modern sub-sector consists of some 800 farms, the average size being approximately 800 hectares. These farms are owned by freehold or concessionary title by individuals and companies, and are known as individual tenure farms.

Title deed farmers own about 37 percent of the total crop land and 25 percent of the grazing land. Farming practices are highly mechanized and market-oriented, which has given rise to some important processing industries.

There are also a number of public-owned, modern farms that are run by governmental agencies. Some of these estates are in Swazi nation land, but modern farming methods and technologies are employed as on individual tenure farms. The major crops grown are citrus, cotton, pineapples, sugar cane, and tobacco.

SWAZI NATION LAND

The remainder of the rural land area is known as Swazi nation land and is owned by the monarch in trust for the Swazi nation. It supports about 42,000 small scale Swazi farmers, whose allotments average less than three hectares in size. About sixty percent of the working age population farm two-thirds of the nation's crop land, but their output is only twenty percent of the total production. Mixed crop agriculture is practiced, predominated by maize for subsistence, with a limited amount of cash crops.

The Swazi are traditionally a pastoral people to whom cattle are to a large extent an indication of wealth. Thus quantity, rather than quality, is all important. Since animals are rarely sold, over-stocking occurs, causing overgrazing and consequently erosion of the grazing land occurs. This situation is aggravated by the lack of proper range management, such as fencing and rotational grazing of natural pastures.

Under the Ministry of Agriculture and Co-operatives there exists a Rural Development Areas (RDA) programme with aims of improving the general standard of living of the majority of the Swazi people and at achieving the broadest possible participation in the process of national development. It is thought that these aims can be achieved by raising the levels of production and consumption of rural families and

increasing the volume and nutritional quality of the food produced, while at the same time ensuring the protection of natural resources. The quality of rural life may be improved by promoting a more commercially oriented approach to agriculture.

AGRIBUSINESS

As the Ministries begin to reach their manpower quotas, the University has become interested in the agribusiness sector as potential employers of their students. The agribusiness sector in Swaziland comprises the following industries: sugar, dairy, meat, poultry, canned fruits, beer and beverages, cotton ginning feed milling, tobacco, forestry and forest products.

SUGAR INDUSTRY

The sugar industry is Swaziland's biggest industry, biggest employer, and biggest export earner. It employs some 16,000 individuals. A limited number of Swazi small-holders are involved in the production of sugar cane on managed settlement schemes. During 1986-87, the product from three mills amounted to 500,000 metric tons. Most of the crop is exported, and all sales are handled by the Swaziland Sugar Association. Its major export markets are the European Economic Community, Portugal and Canada.

POULTRY INDUSTRY

At present there is one diversified operation, the Tinkhukhu Foultry Farm. It produces eggs, day-old chicks and broilers for both the fresh and frozen market. There is a small poultry processing facility in Nhlangano run by a cooperative. Tambankulu Estate raises broilers. Mfumbaneni is a government-owned hatchery in Manzini. There are of course small farm flocks scattered across the country.

PINEAPPLES

Pineapples have proved to be a most satisfactory crop in the middleveld and more particularly in the Malkerns Valley. The area planted has increased steadily and a bumper crop of 44,300 tons was harvested in 1983/84. Dry land cultivation methods are employed and yields have improved considerably as a result of the introduction of a new hybrid variety. The fruit canning factory is situated at Malkerns and is selling a good quality export product.

CITRUS

The best commercial areas for citrus are situated in the lowveld, where climate and soil

conditions are best suited to its production. Large scale commercial plantings are located on the Swaziland Irrigation Scheme at Ngonini, and also in the Big Bend area. The occurence of greening disease in the Malkerns area has not proved conducive to good yields, and the area is now virtually devoid of significant citrus orchards. Grapefruit, oranges, and limes are produced in large quantity. Total citrus production for 1985 was estimated at 54,000 tons, of which 70 percent was exported.

Although the citrus industry relies on sales of fresh fruit of best quality overseas, the South African market and the cannery at Malkerns are useful outlets for non-export grade fruit.

COTTON

Cotton is Swaziland's main dry land crop and is widely grown in the lowveld and in a small portion of the middleveld. It is the most important cash crop to the greatest numbers of producers involving both Swazi farmers and large individual tenure farms. There are over 7,000 small farmers who grew 65.5 percent of the total production of 17,000 metric tons in 1984/85.

There are two ginneries in Swaziland, both owned by the Swaziland Cotona Cotton Ginning Company. The main plant is located in the Matsapa Industrial Estate, the other at Big Bend.

Each has a capacity of 120,000 bales or 24,000 metric tons of cotton per season. Cotton spinning is carried out by the National Textile Corporation. The Company plans to expand vertically into dyed, printed, and finished fabric. There is no cottonseed oil extraction in Swaziland, and seed is exported to the Republic of South Africa.

TOBACCO

One of the cash crops produced by some 4,000 Swazi small-scale farmers is tobacco. Tobacco producers are to be encouraged to increase production through technical assistance and crop-secured loans.

MAIZE and GROUNDNUTS

Maize is the staple food of the Swazi nation and production is undertaken on approximately two-thirds of the utilized arable land area. The 1985 crop was estimated to have been in the region of 85,000 tons of which 75,000 tons was produced on Swazi nation land. This was short of the Kingdom's annual maize needs of 130,000 tons, and importation of maize continues each year.

Groundnuts are the second most important food crop grown by subsistence farmers. Each year approximately five thousand hectares are planted.

DAIRY INDUSTRY

There is only one dairy plant in the country receiving milk. The University has the capability of pasteurizing and packaging milk as well, but currently chooses to sell surplus milk to the Dairy Board. Milk is collected from farms as far as 60 miles (100 km) from the plant. Powdered milk and some milk products are still imported but milk sales through the board's marketing service runs roughly 15,000 litres per day.

MEAT INDUSTRY

Swaziland has a cattle population of about 650,000 head. The Swaziland Meat Corporation has its own feed lot and slaughters up to 25,000 head per annum. About 60 percent is exported as chilled meat and the rest is distributed locally to wholesalers and through the company's own retail outlets. The company also produces a small quantity of canned meat.

Goats utilized for meat are very popular among the Swazi people, and the goat population numbers near 300,000 head.

VEGETABLES

Vegetables are mainly grown on individual tenure farms, but attempts are being made to expand production to the Swazi nation land. Vegetables are expensive in Swaziland and are imported at times.

Other crops of minor economic importance are avacados, bananas, granadillas, ground nuts, mangoes, pecan nuts, sorghum, sweet potatoes, tomatoes and wheat.

FORESTRY

The next largest industry after sugar is forest products. The deep fertile soils and the humid, almost temperate climate of the highveld and parts of the middleveld provide ideal conditions for the growing of trees such as conifers and gums. Approximately 101,000 hectares of man-made forest are located mainly on individual tenure land. Seventy-five percent of these forests are planted with pines. The major products are wood pulp, sawn and mine timber, chipboard, furniture, windows and doors. A major portion of these products are exports.

MINISTRY OF EDUCATION

The purpose of the Ministry of Education is to direct and control the education system while continuing to develop a curriculum which will be broad enough to cater for all talents and assist the individual to achieve his or her potential.

The aim is to improve the quality and relevance of education at all levels by improving and expanding teacher training programmes, curriculum development, strengthening the Ministry's administrative, professional and support services, and by the systematic planning, monitoring and evaluation of educational development and reform.

Priorities of the Ministry over the 4th National Development Plan period are:

Schools Agriculture

1. To secure the supervisory, support and administrative staff necesary to manage the proposed expanded programme.
2. To establish new facilities for schools agriculture; and
3. To strengthen and extend the coverage of the school's garden scheme.

Home Economics

1. To upgrade the teaching facilities in those schools which curently offer a restricted curriculum;
2. To expand the facilities at primary schools at the rate of five per year;

Home Economics

3. To expand the facilities at junior secondary schools at the rate of three per year;
4. To expand the facilities at senior secondary schools at the rate of one per year;
5. To provide teacher training facilities at the Nazarene Teacher Training College that will include a cookery room, laundry, home management unit and administrative unit.

The University of Swaziland

The objectives of the University over the Plan Period are:

1. To produce middle and high level manpower to execute the development efforts of the Kingdom;
2. To undertake teaching and complementary research for the benefit of the students and the country's development efforts;
3. To expand the University's role in the training of teachers for all levels in the education system;
4. To further promote and strengthen continuing education; and
5. To assist in course design and the monitoring of the quality of programmes in the country's teachers and technical training colleges.

The Faculty of Agriculture's main objective of producing the manpower required to staff schools within the Ministry, and following the University's overall objectives would directly support the priorities of the Ministry of Education.

MINISTRY OF EDUCATION INFORMATION ON HOME ECONOMICS SECONDARY AND HIGH SCHOOLS

Home Economics is taught in sixty-eight secondary schools. Twenty-three of these are senior secondary schools and offer the subject at senior level.

There are three Teacher Training Colleges which offer a three year Diploma Course in Primary Education. Home Economics is one of the subjects in the Diploma Curricula.

Inspectorate. There are five inspectors, two coordinators and one senior inspector.

Staffing and Qualifications

1. Secondary Schools and Vocational Secondary School.

   No. of Diplomates: 110 including 4 expatriates.

   Graduates, B.Sc.: 2 including 1 expatriate.

   (The other graduate teacher married a Zambian and moved to Zambia.)

2. Teachers Training Colleges

   No. of Diplomates: 6

   Graduates: 3

   Total Number: 9

3. Inspectorate - Diplomates: 5

   Graduates: 2

   Total Number: 7

   (On Study Leave, 2, 1 Masters, 1 B.Sc.)

HOME ECONOMICS SECONDARY AND HIGH SCHOOLS

CURRENT		NEEDED					
		1988	1989	1990	1991	1992	1993
Diplomates	121	14	14	14	14	14	14
Graduates	7	14	14	14	12	12	12

Introduction of Home Economics at Junior Secondary Schools is presently at the rate of three schools per annum (double streams). At Senior Secondary level the average is three schools (single streams).

The Ministry is planning to introduce in the near future vocational training in sixteen high schools. One such school is in operation now and another will be ready in about a year's time.

(This information was published 14 August 1987
Source: Ministry of Education, M.N. Mabuza,
Home Economist.)

ESTIMATED STAFFING REQUIREMENTS FOR DIPLOMATE AGRICULTURAL EDUCATION TEACHERS FOR SCHOOLS AGRICULTURE PROJECT, FIVE YEARS

REQUIREMENTS FOR DIP. AG. ED. TEACHERS	1986	1987	1988	1989	1990
D. Ag. Ed. teachers required to staff new schools.	4	1	2	2	2
D. Ag. Ed. teachers required to staff schools going into their first 3rd year	3	3	2	2	2
D. Ag. Ed. teachers required to replace those going on to Luyengo B. Sc. Ag. Ed.	3	3	3	3	3
D. Ag. Ed. teachers required to replace expatriate teachers and untrained local teachers (those with D.Ag./D.A.P.H.)	4	3	-	-	-
D. Ag. Ed. teachers to replace those promoted or who drop out.	2	2	2	2	2
Totals of D. Ag. Ed. teachers required from UNISWA (Luyengo)	16	12	9	9	9

Source: J.G. Roques, Senior Inspector (Agriculture)
Ministry of Education.

PROJECTED STAFFING REQUIREMENTS OF SCHOOLS AGRICULTURE FOR THOSE WITH B.Sc. AGRICULTURE EDUCATION, FIVE YEARS

AREAS OF REQUIREMENTS	1986	1987	1988	1989	1990
O-level (expanding at a rate of 3 schools per annum)	3	1	2	2	2
Administrative team - (5 Coordinators/ 1 Senior Coordinator/ 1 Senior Inspector	-	-	1	1	-
Teacher Training - 8 lecturers (1 William Pitcher/ 1 Nazarene/ 1 E.D.C./ 5 Ngwane)	-	1	-	-	-
Dropout rate - Estimated at 10%	2	2	2	2	2
Replacement of Expat. or underqualified teachers	4	2	-	-	-
Totals of B.Sc. (Ag.Ed. graduates required.)	9	6	5	5	4

Source: J.G. Roques, Senior Inspector (Agriculture)
Ministry of Education.

ADEQUACY OF SKILL TRAINING IN THE AGRICULTURE TEACHER EDUCATION PROGRAM

To determine effectiveness of the Agriculture Teacher Education Program in preparing teachers in various skills, teachers, teacher educators, and inspectors (alumni) were asked to evaluate adequacy of training in various professional and technical skills.

Fifty-six skills were rated. Only two received an overall rating of adequate, "Use of Real Objects in Teaching ($\bar{X}$ = 5.0) and "Planning / or Theory Class" ($\bar{X}$ = 5.1).

Approximately twenty-seven skills were rated somewhat adequate and twenty-seven skills were rated inadequate.

Land use and mechanization related skills received the lowest ratings and were considered inadequate.

The conclusion was drawn that skill training is inadequate by the Agriculture Teacher Education Program in Luyengo.

Barnabas M. Dlamini, Ph.D., Perceptions of Professionals in Agricultural Eduction Regarding the Agriculture Teacher Education Program in Swaziland, page 68.

MINISTRY OF AGRICULTURE AND CO-OPERATIVES

The purpose of the Ministry of Agriculture and Co-operatives is that of formulating policy and administering legislation as it is related to agriculture, and to co-ordinate all development activities, particularly as it relates in the areas of rural development and subsistence farming.

There exists within the Ministry a total of five departments. They are: Research and Planning, Veterinary Services, Agricultural Extension, Co-operatives, Marketing and Administration.

Priorities of the Ministry over the 4th National Development Plan period are:

1. To reduce the shortage of trained local manpower at the higher technical and professional levels;
2. To strengthen the crop and livestock extension services;
3. To extend farm services, marketing, credit and co-operative facilities;
4. To encourage the provision of infrastructural services;
5. To promote increased marketing of key foods and cash crops by Swazi farmers; and
6. To improve animal production and increase productivity.

THE FACULTY OF AGRICULTURE'S main objective is to produce the manpower required for the administrative and professional support of agriculture throughout the country. Their objective would then directly support the priorities as articulated by the Ministry of Agriculture.

MINISTRY OF AGRICULTURE AND CO-OPERATIVES

FORECAST OF VACANT POSTS FOR THE NEXT FIVE YEARS

POST	No. of VACANT DIPLOMATES	YEAR POST VACANT 1988	1989	1990	1991	1992
FIELD OFFICER	2	1	1			
RURAL DEV. OFFICER	1			1		
EXTENSION OFFICER-POULTRY	1				1	
ANIMAL HEALTH INSPECTOR	8	7	1			
ASST. ANIMAL HEALTH INSPEC.	6	2	1	3		
VETERINARY ASSISTANT	5	1	1	1	1	1
ASST. HOME ECON. OFFICER	1		1			
DOMESTIC SCIENCE DEMONSTRATOR	1		1			
LIVESTOCK EXTENSION OFFICER	1		1			1
SENIOR FARM MANAGER	1					1
CO-OP MANAGEMENT	10	5		5		
TOTAL	37	16	7	10	2	2

POST	No. of VACANT GRADUATES	YEAR POST VACANT 1988	1989	1990	1991	1992
CHIEF ANIMAL HEALTH INSPEC.	1				1	
SR. ANIMAL HEALTH INSPECTOR	3		1	1	1	
PROJECT MANAGER	1		1			
SR. HOME ECON. OFFICER	2		1			1
LAND UTILIZATION OFFICER	1			1		
SENIOR EXTENSION OFFICER	2				2	
DIRECTOR OF AGRICULTURE	1	1				
TOTAL	11	1	3	2	4	1

MINISTRY OF AGRICULTURE AND CO-OPERATIVES

PROPOSED POSTS FOR APPROVAL BY MINISTRY OF LABOUR AND PUBLIC SERVICE IN THE NEXT FIVE YEARS

POST	No. of Posts	Qualification
RESEARCH RECORDER	1	Diploma
LABORATORY ASSISTANT	1	Diploma
ASSISTANT EXTENSION OFFICER	2	Diploma
FIELD OFFICER	1	Diploma
AGRICULTURE	5	Diplomates
RESEARCH OFFICER	1	Graduate
AGRICULTURAL OFFICER	3	Graduate
GENERAL MANAGER	1	Graduate
TECHNICAL SUPERVISOR	1	Graduate
AGRICULTURE	6	Graduates

Source: Richard Shabalala, Undersecretary,
Ministry of Agriculture and Co-operatives.

"AIMS AND OBJECTIVES -- FACULTY OF AGRICULTURE

GENERAL: To produce high- and middle-level trained manpower needed for national development in applied science.

SPECIFIC: The Faculty of Agriculture was established to train high- and middle-level manpower in agriculture and related areas of knowledge; and:

1. to provide a centre for formal study of agriculture, agricultural education, home economics and associated areas of learning.
2. to further the education of professional and other persons working or intending to work in the field of agriculture and related areas at primary, secondary and tertiary levels of education.
3. to create, preserve, transmit and increase skills and knowledge in the area of agriculture and associated disciplines through research and publication, teaching and extension.
4. to work and forge links with national and international institutions, bodies, agencies and individuals, whether academic or professional, in the interests of promoting development in agriculture and related areas of knowledge.
5. to provide a consultative and co-ordinating machinery for all involved in agro-based industries, agricultural education and practices and other associated applied sciences."

(Faculty of Agriculture brochure, UNISWA)

SUPPLY OF GRADUATES, INCLUDING DIPLOMA HOLDERS, FROM THE UNIVERSITY OF SWAZILAND, LUYENGO CAMPUS, 1981-1993

	ACTUAL		PROJECTED					
YEARS	1985-86	1987	1988	1989	1990	1991	1992	TOTAL
A. DEGREES								
B.Sc. Agriculture	12	16	7	12	14	16	16	93
B.Sc. Agriculture Education	15	5	12	13	12	16	16	89
TOTAL	27	21	19	25	26	32	32	182
B. DIPLOMAS								
Agriculture	30	16	17	21	27	31	30	172
Agric. Education	28	36	27	26	28	31	30	206
Home Economics	19	29	25	29	29	30	30	191
TOTAL	66	81	69	76	84	92	90	569

A. Source: Student Records, UNISWA

B. Source: Manpower, Education and Training, Vocational Training Branch, International Labour Office, CH-1211 Geneva 22.

COMPANIES INTERVIEWED

1.	Arrowchem	Manzini
2.	Farm Chemicals Ltd.	Manzini
3.	Inyoni Yami Swaziland Irrigation Scheme	Tshaneni
4.	Manzini Industrial Training Centre	Manzini
5.	Metro Cash and Carry	Manzini
6.	Mhlume Sugar Company	Mhlume
7.	Mondi Forests	Piggs Peak
8.	National Textile Corporation of Swaziland	Matsapa
9.	Ngwane Brewery	Matsapa
10.	Shell Oil of Swaziland	Matsapa
11.	Shiselweni Forest Company	Nhlangano
12.	Simunye Sugar Estate	Simunye
13.	Swazi Can	Malkerns
14.	Swazi Pak (Pty) Ltd.	Matsapa
15.	Swazi - Track	Matsapa
16.	Swazi Xerox	Mbabane
17.	Swaziland Breweries	Matsapa
18.	Swaziland Cold Storage	Manzini
19.	Swaziland Cotona	Manzini
20.	Swaziland Dairy Board	Malkerns
21.	Swaziland D & S Bank	Mbabane
22.	Swaziland Meat Corporation	Matsapa
23.	Swaziland Mechanized Farming	Matsapa
24.	Swaziland Sugar Association	Simunye
25.	Swaziland Warehouse	Manzini
26.	Tambankulu Estates	Mhlume
27.	Tibiyo Agriculture	Malkerns
28.	Tibiyo Frasers Trading	Manzini
29.	Timbuti Farm	Mbabane
30.	Ubombo Ranches	Big Bend
31.	United Plantations	Ngonini
32.	W. G. Lewis & Company	Manzini

TABLE 1

EMPLOYERS OF LUYENGO GRADUATES BY YEARS OF EXPERIENCE

Years of Experience	Frequency (f)	Percentage (%)
Less than 5	12	37.50
5 - 9	9	28.13
10 - 14	5	15.63
15 and above	2	6.25
Missing data	4	12.50
Total	32	100.00%
Mean	6.32	

Employers of Luyengo graduates were asked to indicate the number of years they had worked in their present occupation. The results were developed in Table 1. The average number of years of work experience was 6.32. The conclusion was drawn that employers of Luyengo graduates have a limited number of years experience as managers.

TABLE 2

EMPLOYERS TYPE OF FIRM OR ORGANIZATION

Type of Organization	Frequency (f)	Percentage (%)
Parastatal	5	15.63
Private	27	84.37
Total	32	100.00

Table 2 indicated the employer's type of firm or organization. The majority of the firms, twenty-seven or 84.37% were private and the remaining 15.63% were parastatal. Obviously, the survey was conducted mainly with private organizations.

TABLE 3

CATEGORIES OF FIRMS OR ORGANIZATIONS SURVEYED

CATEGORY	Frequency (f)	Percentage (%)
1. General Crop Production	2	6.25
2. Fruit Production	2	6.25
3. Agric. Chemicals Drugs/Fertilizers	1	3.13
4. Livestock and Product Processing/Marketing	4	12.50
5. Fruit Processing/ Marketing	2	6.25
6. Farm Industrial Machines	1	3.13
7. Food Distribution	1	3.13
8. Forest Production/ Processing/Marketing	2	6.25
9. Sugar Production/ Processing/Marketing	3	9.38
10. Other	14	43.75
Total	32	100.00

TABLE 3

Table 3 presented the categories of firms or organizations surveyed. Results revealed that a rather wide range of categories or types of firms were represented. Fourteen of the firms or 43.75% were categorized as "other," and these were rather small firms. Forestry, sugar, livestock and crop production were some of the firms represented as indicated in the Table.

TABLE 4

EMPLOYERS FIRM OR ORGANIZATION
BY NUMBER OF EMPLOYEES (FULL-TIME)

Number of Employees	Frequency (f)	Percentage (%)
0 - 499	23	71.88
500 - 999	4	12.50
1,000 and above	5	15.62
Total	32	100.00

The information contained in Table 4 indicated size of the firm or organization. The majority, twenty-three or 71.88% of the firms employ less than 500 people, while four or 12.50% and five or 15.62% employ 500-999 and 1,000 and above respectively.

TABLE 5

NUMBER OF DIPLOMATES AND GRADUATES EMPLOYED BY ORGANIZATIONS IN THE YEAR 1987

Qualification	Frequency (f)	Percentage (%)
Diplomates	154	62.35
Graduates	93	37.65
Total	247	100.00

Table 5 presented the number of Diplomates and Graduates employed by organizations in the year 1987. As can be seen, the majority, 154 or 62.35% were Diplomates and 37.65% Graduates. The conclusion was drawn that organizations were more heavily staffed with Diplomates.

TABLE 6

NUMBER OF POSITIONS WHERE AGRICULTURAL UNIVERSITY TRAINING IS OF VALUE

Number of Positions	Frequency (f)	Percent (%)	Number of Value	Percent (%)
0	11	34.38	0	0
1 - 9	13	40.62	47	20.70
10 - 19	4	12.5	56	24.67
20 and above	4	12.5	124	54.63
Total	32	100.00	227	100.00

Organizations surveyed were asked to indicate the number of positions where agricultural university training was of value. The information contained in Table 6 reveal that thirteen or 40.62% of the firms had less than ten positions where agricultural university training was of value. Four, or 12.45% had 10-19 positions and another 12.5% had 20 and above. Interestingly, eleven or 34.38% indicated that they had no positions where agricultural university training was of value.

TABLE 7

DIPLOMATE PERSONNEL EMPLOYED AND PROJECTED REQUIREMENTS BY TYPE OF PROFESSION

Type of Profession	Number of Swazi Diplomates	Number of Expatriate Diplomates	Total Number of Diplomates	Current Diplomate Vacancies	Number Needed 1988-93
Technical Posts	75	25	100	27	48
Sales & Service	2	1	3	1	10
Management & Finance	45	8	53	3	32
Office & Clerical	4	1	5	0	7

TABLE 7

Data was gathered to determine the number of diplomate personnel employed and projected requirements by type of profession. The results were presented in Table 7, with the number of current Diplomate vacancies and number needed 1988-93 summing to 128 positions for the thirty-two firms interviewed. The average is four positions per firm.

The greatest need was in technical posts where current vacancies were 27, and 48 were projected over the next five years, or an average of 2.3 positions per firm interviewed.

The other professional area that needed considerable trained personnel was management and finance, with three current vacancies and thirty-two projected over the next five years, or an average of 1.1 position per firm.

The sales and service category, and office and clerical required twenty-one over the time frame considered.

Interestingly, a greater percentage of expatriate to Swazi staff are employed in technical posts, 33%. In management and finance there are 18% expatriates.

The total number of expatriate staff came to thirty-five and a large number of those positions were projected to be replaced in the next five years.

TABLE 8

GRADUATE PERSONNEL EMPLOYED AND PROJECTED REQUIREMENTS BY TYPE OF PROFESSION

Type of Profession	Number of Swazi Graduates	Number of Expatriate Graduates	Total Number of Graduates	Current Graduate Vacancies	Number Needed 1988-93
Technical Posts	22	28	50	5	25
Sales & Service	3	3	6	0	4
Management & Finance	26	38	64	4	21
Office & Clerical	8	0	8	0	0

TABLE 8

Table 8 illustrated graduate personnel employed and projected requirements by type of profession.

The number of current graduate vacancies and number needed 1988-93 came to a total of sixty positions for the thirty-two firms interviewed, for an average of approximately two positions per firm. It would appear that the demand in industry for the next five years will be approximately two diplomates for each graduate employed.

There was greatest need for graduate personnel in the technical and management and finance areas, and a few, four, in sales and service.

Education in the management and finance area appears to become relatively more significant at the graduate level than at the diplomate level. At the graduate level, needs are about equal between technical and management and finance, while at the diplomate level the needs were more in favor of the technical area.

The data also indicates the importance of degree training for Swazi citizens, as the number of graduate expatriates employed significantly outnumber the number of Swazi citizens employed.

TABLE 9

RECRUITMENT OF PROFESSIONAL JOB CANDIDATES BY METHOD

Method of Recruitment	Frequency (f)	Percentage (%)	Rank
Educational Institution			
Staff Referral	3	9.38	4
Newspaper Adver.	17	53.13	1
Personal Contacts	4	12.50	3
Graduate Initiative	3	9.38	4
Other	5	15.61	2
Total	32	100.00	

Table 9 indicated the method used to recruit professional job candidates. Newspaper advertisement was the most commonly used method by seventeen of thirty-two, or 53.13%. of the organizations. Currently the University and its staff seem to play a small role in supporting employment of its alumni with industry.

TABLE 10

IMPORTANCE AND RANK OF CRITERIA USED IN SELECTING DIPLOMATES/GRADUATES FOR EMPLOYMENT

CRITERIA RATED	Mean (X) N = 32	Rank
Academic Record	1.47	3
Aptitude Tests	2.00	4
Employment Interview	1.06	1
Similar Work Experience	1.28	2
Letters of Recommendation	2.03	5
Gender	2.25	6
Marital Status	2.47	7

Rating Scale: 1 = Very Important
2 = Important
3 = Not so Important

TABLE 10

Employers were asked to indicate the criteria considered important in selecting Diplomates and/or Graduates for employment. As can be seen in Table 10, the highest three were: employment interview, similar work experience, and academic record, with means, 1.06, 1.28, and 1.47 respectively. Gender, marital status, and letters of recommendation were considered less important factors in selecting candidates for a job.

One would conclude that good students with similar work experience have a decided edge over others in obtaining a job with industry.

TABLE 11

SKILLS NEEDED BY LUYENGO GRADUATES TO BE MORE EMPLOYABLE BY PRIVATE OR PARASTATAL FIRMS/ORGANIZATIONS

SKILL RATED	Mean ($\bar{X}$) N = 32	Rank
Business & Economic Skills (accounting, budgeting, finance)	1.47	4
Management Skills (planning, organizing, supervising)	1.22	3
Communication Skills (listening, reading, writing, public speaking.)	1.19	2
Developed Technical Skills (production, processing)	1.72	6
Science & Laboratory Training (soil chemistry, bio-sciences)	2.00	8
Mechanical Training (shop skills, power mechanics)	1.75	7
Employment, Work Experience (farm, industry, business)	1.47	4
Developed Personal Attributes (motivation, confidence, leadership)	1.01	1

Rating Scale: 1 = Very Important

2 = Important

3 = Not so Important

TABLE 11

The information contained in Table 11 indicated the skills needed by Luyengo graduates so they would be more employable by private or parastatal organizations. All the skills were considered important. Developed personal attributes motivation, confidence, leadership, received the highest rating ($\bar{X}$ = 1.01), or Very Important.

Communication skills, listening, reading, writing, public speaking, ranked second. ($\bar{X}$ = 1.19)

Management skills, planning, organizing, supervising, ranked third. ($\bar{X}$ = 1.22)

Business and economic skills and employment work experience ranked fourth at ($\bar{X}$ = 1.47)

Interestingly, science and laboratory training ranked eighth and lowest with ($\bar{X}$ = 2.0) and was considered as only Important.

The data presented here would indicate that the University should consider methods by which the individual's personal attributes, communication skills, and management skills can be further developed so they are more employable by industry. The larger number of graduates will be employed in situations of management, where they must be self motivated and confident in their ability to plan and then organize men, women, and materials, then supervise and coordinate the work activity.

Technical skills and mechanical training were ranked lower. Companies thought graduates would become supervisors.

TABLE 12

PROVISION OF INSERVICE TRAINING BY ORGANIZATIONS

Provision of Inservice Training	Frequency (f)	Percentage (%)
Do Provide	25	78.13
Do Not Provide	7	21.87
Total	32	100.00

As can be observed in Table 12, twenty-five, or 78.13% of the firms do provide inservice training for their employees. Only a small portion, seven, or 21.87% do not provide inservice training.

TABLE 13

PROVISION OF INSERVICE TRAINING BY TYPE

TYPE	Frequency (f)	Percentage (%)
Training Conducted Within Organization by Own Staff	20	62.50
Training Conducted Within Organization by Contract	17	53.13
Part-time (day release)	19	59.38
Full-time During the Course	24	75.00

Twenty-five or 75% of the organizations provided full-time inservice training during a course. Twenty,or 62.5% provided training within their own organizations with their own staff. Seventeen of the organizations conducted training by contract, and nineteen provided part-time, day release, inservice training.

The conclusion is that firms or organizations do provide different types of inservice training.

TABLE 14

LOCATION OF TRAINING FOR STAFF

PLACE	Frequency (%)	Percentage (%)
Swaziland	7	21.87
Outside Swaziland	25	78.13
TOTAL	32	100.00

Participants in the survey were asked to provide information regarding location of training for their staff members. As indicated in Table 14, the majority, twenty-five or 78.13% of the organizations send their employees outside Swaziland for training. Only seven, 21.7%, are trained within Swaziland.

The main reasons why staff are sent out of the country include: the training is not offered locally; the specialized facilities are not available locally; the training officer is based in another country; to widen the experience of the employee and build confidence.

Employees are sent for specialized training in: accounting, agronomy, ag mechanization and irrigation,

TABLE 14

citrus and sugar cane culture, crop protection and chemicals, dairy technology, forestry, fleet management, merchandizing and commodity presentation, leadership and senior management.

TABLE 15

CHANGES NEEDED IN THE FACULTY OF AGRICULTURE TO RESPOND TO FIRMS/ORGANIZATIONS NEEDS (N = 32)

Change Needed	PERCENTAGE Yes	No	No Opinion	Total
1. Reformulating Curricula	25.00	9.40	65.60	100.00
2. Revising the Method of Instruction	18.80	9.40	71.80	100.00
3. Developing New Training Programmes	43.40	6.30	50.30	100.00
4. Carrying Out Research Projects Related To Organization	43.40	9.40	47.20	100.00

Respondents to this study were requested to indicate the ways that the University Faculty of Agriculture could become more responsive to the needs of industry. As can be seen in Table 15, the majority (43.40%) of the respondents indicated that the Faculty of Agriculture needs to carry out research projects related to industry and develop new training programmes.

TABLE 15

Should the Faculty reformulate curricula? 25% of the respondents had this view. 18.80% indicated the need for revising the method of instruction, that is putting more emphasis on practical work.

Comments: Two types of comments surfaced equally as the most common. The first being that agricultural training should be practical and not theoretical, the second that business, management, and entrepreneurial skills should be developed. Newly employed UNISWA graduates are slow to adapt to the industrial work environment.

The third most common comment was that better supervisory and communication skills should be taught as UNISWA graduates were often placed in personnel management situations. Some graduates have also been placed in sales positions, and development of interpersonal relations and sales techniques were considered important.

Areas for increased emphasis were indicated as follows: Agricultural Engineering - irrigation, farm machinery, processing machinery, and quality control, refrigeration and atmospheric control.

Introduce students to the marketing of fruits and vegetables, and the processing of food.

Introduce students to forestry technology.

Develop specific major areas: Crop Science, Animal Science, Agric. Engineering. The dissertatiom project is useful and should be continued.

TABLE 16

OFFERING OF SHORT COURSES ON PRACTICAL SUBJECTS BY THE UNIVERSITY OF SWAZILAND

RESPONSE	Frequency (f)	Percentage (%)
1. Should Offer Courses	23	71.87
2. Should Not Offer Courses	4	12.50
3. No Opinion	5	15.63
Total	32	100.00

TABLE 16

Table 16 revealed that 23 (71.87%) of the industries surveyed expect the University Faculty of Agriculture to offer short courses on practical subjects. Topics of prime interest included the following:

1. Agricultural management, commerce and business skills including accounting and computer use.

2. The economics of machine and equipment use.

3. The proper use of machinery including calibration and instrument setting.

4. An update on crop and animal production skills as suited to Swaziland conditions.

5. Proper and improved irrigation and drainage techniques.

6. Agricultural chemicals, new products and proper use, including safety measures.

7. Lab analysis technique, including quality control in milk and yeast propagation.

8. Communication and situational leadership techniques.

9. Retail marketing of fruits and vegetables.

TABLE 17

FIRMS/ORGANIZATIONS INTEREST IN OFFERING VACATION EMPLOYMENT TO UNIVERSITY STUDENTS

RESPONSE	Frequency (f)	Percentage (%)
Interested	18	56.25
Not Interested	12	37.50
Not Sure	2	6.25
Total	32	100.00

Information contained in Table 17 indicated that 56.25% of the respondents were interested in offering vacation employment to University students and 37.50% were not interested.

Comments: Four firms indicated that they currently provide vacation employment. Three said accommodations could be a problem. One firm could easily place two students on its assembly line and one in its laboratory.

The experience would encourage students to become familiar with real world problems, and specific industries. UNISWA staff should prepare the students to help avoid attitude problems. Preplanning suggested.

TABLE 18

PROJECTS WITHIN ORGANIZATIONS THAT COULD BE ACCOMPLISHED BY UNIVERSITY STUDENTS

	Frequency (f)	Percentage (%)
Projects Available	19	59.37
No Projects	10	31.25
Not Sure	3	9.38
Total	32	100.00

Information contained in Table 18, revealed that 59.37% of the organizations had projects that could be accomplished by University students, 31.25 percent did not have such projects and 9.38% were not sure.

Comments: Five firms indicated interest in having students prepare market studies.

Five firms indicated research but were not specific to the type of research.

Other projects suggested were soil surveys, irrigation mapping, village planning, cash flow budgeting, and accounting.

Firms that were not specific to the type of research said they would be interested in working out the details with UNISWA faculty.

TABLE 19

COLLABORATION OF FIRMS/ORGANIZATIONS WITH UNISWA

	Frequency (f)	Percentage (%)
1. There is need for Collaboration	22	68.75
2. No need for Collaboration	1	3.13
3. Not Sure	9	28.12
Total	32	100.00

TABLE 19

In order to improve the relationship between the University of Swaziland and Industry, an effort was made to determine whether the private sector wanted to have a closer association with UNISWA. As shown in Table 19, twenty-two, or 68.75% of the organizations indicated that collaboration was needed between Industry and the private sector and nine or 28.12% were not sure.

Comments: Industry and UNISWA would both benefit by sharing ideas and information.

Industry could use technical help with crops and livestock, and would welcome practical research in pineapples and other fruits.

Faculty could work as consultants on quality control problems, and on training projects. Industry could also provide expertise to UNISWA.

With more interaction faculty might be able to design more appropriate course work.

Industry needs to know more about the UNISWA program and relationship could be improved through a newsletter or by announcing upcoming events and short courses, open lectures on timely subjects, campus open days, and more contact with faculty and students.

Industry can provide a variety of inputs to the University to support student training.

TABLE 20

WILLINGNESS OF INDUSTRY TO PROVIDE GUIDANCE OR SHARE INSIGHTS WITH UNISWA

	Frequency (f)	Percentage (%)
1. Willing	27	84.38
2. Not Willing	2	6.25
3. Not Sure	3	9.37
Total	32	100.00

Table 20 presented information regarding the willingness of industry to provide guidance or share insights with UNISWA. There were 84.38% of industries positive. Comments: Firms expressed willingness to: Share in an interchange of knowledge, research and skills. Share their industry's highly experienced training officer for purposes of exchanging ideas. Help the University develop a more practical program so students would improve their ability to put theory into practice. Help students with career guidance so that they might train with a purpose in mind. Provide opportunities for field trips. Provide speakers for class lectures.

INTRODUCTION TO CHANGE

One of the very basic problems in the current curriculum is that it was designed with the objective of producing teachers either in the school system or in the Extension Service. In the past this was a reasonable concept, and the production of graduates with reasonable capability in that direction has been achieved. The role of the University in this process of producing teachers will necessarily continue, but on a much reduced basis.

Both the Ministry of Agriculture and the Ministry of Education have indicated their intent of limiting their role in this regard. Consequently, the time is at hand for curriculum change and both faculty and administration have stated their strong interest in getting on with the task.

The University now has in its hands the data obtained from an intense survey of Industry of the kinds of skills they believe to be important to ensure productive employment. These same kinds of skills can be used by the individual University alumnus for self employment.

ALTERATION TO AIMS AND OBJECTIVES

The Aims and Objectives of the Faculty of Agriculture were developed through much thought, and were for the most part entirely correct in their substance. With the changing times it would appear that additional objectives could be added to the list, and then proposed changes to curriculum could be brought better into focus.

Two pertinent ideas should be incorporated, the first and most important, would be to develop each individual to their maximum potential through the development of self-reliance, manipulation and marketable skills, creativity and initiative, leadership and entrepreneurship.

In talking with a variety of individuals, including many Swazi nationals, the impression is created that the product of the University might be improved in these areas.

The second would be to broaden the perspective of the instructional process and might be worded along the following terms: to develop an appreciation for and commitment to the development of agricultural productivity and related agricultural service, supply, processing and marketing enterprises through the development of wholesome work habits, and positive attitudes toward improving rural life.

The idea behind this objective is to incorporate the importance of off-farm activity but to maintain the idea that it must be developed in a way to provide support for the rural producer.

With these two objectives firmly in mind the University should be able to constructively reorient its curriculum to broaden the horizons of its students to think in terms of employment in the private sector and to think in terms of self employment rather than rely on government employment.

STUDENTS NEED TO EXPERIENCE PROFITABILITY

Profitability is another area that bears much attention in the University process. The expectation is that someone out there, preferably government, will employ them upon graduation. This concept must be attacked at the very basic level.

The first item has already been covered, build confidence in the student's ability to create on his own behalf. Take the person along slowly in the beginning to make sure that he or she has been prepared on "how to undertake a project," then as they progress through the program make sure that skills previously taught must be demonstrated by the student on his own part. The final project should be loosely monitored but the underlying force should not be to attain a grade or write a paper but that the entire process from planning, securing of finance, purchase of inputs, seeding and control of various types of pests, irrigation, harvesting, shipping and marketing should be under the direction and control of students, with profit as the objective.

Advance planning to provide guidance of course has to be provided for by the University.

The educational process has to be changed from how much material can your University student absorb toward how many ideas can they in fact apply. Profitability is the strongest motivator, but students need to taste it to appreciate it.

Private industry is in search of people with the right character who exhibit the ability to grasp the hammer and perform the task, not someone who talks about how the task might be accomplished.

Funds should be sought to underwrite an enterprise project system. Such a system provides an opportunity for students to experience the profit motive, and teaches responsibility at the same time. It means some additional work for the faculty, but the results are more than worth the effort.

The basic animal enterprise contract utilized by the California Polytechnic State University Foundation is included as an addendum for review.

CURRICULUM DESIGN

The time tables for instruction in the agricultural curriculum are currently overcrowded (See Time Table). This often occurs where each specialist wants more hours to teach his or her specialty and not enough attention is paid to the total content of the curriculum. This overcrowding leads to lack of time for students to study, or do farm work, and results in a less than adequate effort by the lecturer.

Agricultural science education is always a very expensive undertaking. According to the University Registrar's Office the cost of a four year agriculture degree was 32,000 Emalangeni while that of a social science degree was only 20,000 Emalangeni. Therefore, the number of years devoted to the B.Sc. degree should not number more than four. The problem is how to alleviate the overcrowded schedule, and yet prepare the student to be productive upon entering the work force.

The University should stop pretending that agriculture students are going to be obtained through the first year Faculty of Science Program taught at the Kwaluseni campus. Few students have been finding their way to Luyengo through that program, and the situation will not soon be improving.

Improvements should be made to the Luyengo lab facilities inorder that biological, chemical, and physical sciences can be taught from an agricultural

perspective to qualified entering students at this campus. An entire initial year should not be devoted to these subjects. Instead, students entering the four year B.Sc. program should be taught basic animal and crop husbandry courses in a lower division or core set of courses that Diploma seeking students would also be taking. Savings in time for faculty and students must be obtained through core course teaching at this level. The majority of deepening and enrichment of course content can be done during the last two years of the B.Sc. program.

Diplomates returning after a work period to study in the B.Sc. program would be required to make up science courses, and a few courses that B.Sc. students may have had in the second year as their program began the enrichment process. Thus returning Diplomates would be required to take three years for completion of the degree. The object would be that both the Diploma and B.Sc. programs would be made very practical in the first year. Students would be expected to care for and raise crops and animals to a much greater extent than at present. Also, there should be more effort expended toward "hands-on" experiences in shop situations. Students should not only learn how, but should construct animal feeders, small farm buildings, fences, and plumbing works. They should be taught to build with metal through riveting and welding.

Unfortunately, the maintenance crew has taken over the student workshops. Faculty need to have new and larger facilities built to accommodate shop classes and make room available for agricultural engineering projects.

The Industry Survey shows that more in-depth emphasis needs to be provided on few subjects. It also shows that not enough emphasis has been placed on management.

One of the greatest problems is that there appears to be too much material presented in the General Agricultural Programme with the student required to pass all five subjects. The only possible way out of this dilemma is with some form of streaming or grouping of subjects that is accomplished after a solid foundation is laid in the first three years. The numbers of students studying agriculture at Luyengo mitigates against forming several separate majors, but suggests an "option" form instead.

PROPOSED CURRICULUM DESIGN EXPLANATION

During the first year all students take common courses, or courses closely enough aligned that they could be substituted regardless of the final option specialization of a student.

Heavy emphasis would be placed upon farm work experience during this time frame.

During the second year the three basic agricultural areas would be continued, plus Agricultural Management added at an introductory level for all students. The diploma students would complete their specialty area. The B.Sc. students would complete the basic science course work.

During the third year the basic agricultural subjects would be continued, building upon the science base established in year two. Students would all continue agricultural management subjects, but Agriculture Extension and Education and Home Economics students would both begin to specialize. Course content in Agricultural Management in this year would stress material considered appropriate for all students.

During the fourth year students would complete two of the basic agricultural subjects plus one of the specialty areas.

PROPOSED CURRICULUM DESIGN

	BASIC AGRICULTURAL PRODUCTION	SPECIALTY
	ANIMALS PLANTS AG. ENGINEERING	AG. MANAGEMENT AG. EXT. & ED. HOME ECON.
YEAR 1	Common courses for both Diploma and B.Sc. students.	
YEAR 2	Continued	Diploma students complete one. B.Sc. Specialization begins for B.Sc. Science course core for B.Sc. students.
YEAR 3	B.Sc. continue Basic Agricultural Production.	B.Sc. B.Sc. specialties continue.
YEAR 4	Applied Science Aspects and more Advanced Production Studies. COMPLETE TWO BASIC AG. PRODUCTION COURSES.	More Advanced Studies for all specialties. PLUS ONE SPECIALTY.

COURSE ORGANIZATION

The course materials need to be repackaged to develop a common core in the early years of the program regardless of the track students pursue. The object should be to start with the less intense, less demanding scientific classes, and easier to grasp concepts so that students with lesser ability are not lost.

This is the time to introduce the Farm Work Shop, and make sure the students are heavily engag in developing basic skills. The attempt should be directed toward completion of projects in the utilization of skills. The building of fences, the mixing and pouring of concrete, sharpening of blades and twist drills, the bending and tempering of metals, proper squaring and sawing techniques, and basic pipe work for bringing water to animals. Projects that the University needs to complete should be performed by these students. The idea that they can create with their own hands will build confidence in their abilities. The observation that instructors call in maintenance people, hire outside firms, or outside labor to complete all tasks teaches the student that all hand skill related work is for someone else to do.

Companies complain that the University product that they come in contact with is incapable of accomplishing the most meanial task. This is an area the University must develop first and foremost.

Graduates certainly can not plan, project, organize materials, and supervise other people in the completion of these kinds of tasks if they have only memorized formulas and taken examinations.

MACHINERY

The modern agriculture sector employs a lot of equipment in its farming practices. Because of the large investment associated with machinery, industry is interested in individuals trained in the operation, maintenance, and repair of this equipment.

They are interested in the person that understands the importance of costs and capacities, the importance of efficient operation, and the relationship between labor needs and power requirements.

The University should seek to obtain the variety of equipment it requires to teach about tillage, planting, cultivation, spraying, harvesting, and processing of farm commodities.

IRRIGATION

Swaziland is endowed with numerous rivers and streams, opening up opportunities for water collection and irrigation. The large estates of sugar and citrus irrigate to boost yields and protect their crops from drought. The University has area under sprinkler irrigation, and can easily mount intense course work in this area because of cheap water already purchased for the farm.

Course work should evolve in two directions, the first being irrigation water management. The student will know the various methods of irrigation (drip, sprinkler, surface), their adaptability and limitations. Fields need to be organized for demonstration and evaluation of various methods of irrigation. Secondly, course work should be organized around groundwater resources, drilling methods, development of wells, kinds of pumps and their agricultural applications.

Facilities must be developed to demonstrate and test various kinds of pumps, water flow rates, pipe and ditch flow, and methods of determining soil moisture deficiencies.

The current system, which is located near the buildings, requires pumps for pressurizing.

A pond should be built for additional storage. Only one plot can currently be watered per day. This is not sufficient for proper utilization of the land.

The current Land Use and Mechanization (LUM) laboratory must be enclosed to keep the dust, dirt, weather, and predators out. Some additional irrigation machinery and testing equipment should be purchased for lab use. The stored materials should be removed, the place cleaned up and utilized as the main classroom for the LUM Department.

THE UNIVERSITY IS AN ISLAND

The University in its current state exists primarily as an island, with its faculty isolated from alumni who are employed by the Ministry of Agriculture and Co-operatives, and to some extent from the Ministry of Education.

What needs to be fostered is a closer working relationship between those operating alumni and the University faculty through continued education. This should include workshops, skills weeks, even a National Annual Convention.

There should be joint appointments between the UNISWA faculty and the research officers at Malkerns so that research is written into the contracts at both places. This time would be allocated 3/4 - 1/4 so faculty at the University could carry a 1/4 time research appointment while research officers could carry a 1/4 time teaching. Thus the excellent staff at both places would bring their expertise to bear on the crop and livestock problems of the Kingdom of Swaziland. If the library at the Luyengo campus were to have a wing added, students could study there, and research officers from Malkerns could share the library facilities.

There should be a formal approach at the official level so that a formal understanding could be developed in order to avoid duplication in research efforts and make the facilities at both institutions available jointly for the missions of education and research. Joint meetings between the faculty of agriculture and agriculture research officers should aim toward co-ordinating research efforts within the country.

FACULTY - AGRICULTURAL BUSINESS LINK

Faculty should work with agricultural processing businesses to lay the ground work for eventual entry of Luyengo graduates into these industries. At the present time these firms do not realize the significance of the agricultural education program, and the potential for its support of their businesses. Eventually course work will need to be developed in this area.

Some basic grading of citrus, bananas, vegetables, and the candling of eggs can be practiced with additional equipment and facilities. Slaughtering of rabbits and chickens and even larger animals could easily be taught. The dairy has the capability of processing milk, pasteurizing, cooling, and packaging. Cheese and butter production could also be taught fairly easily.

THE ROLE OF THE FARM

The farm should make money on some projects, but a large function of the farm should provide productive farm experience for students. Products of the farm should provide the basis for further education in the processing and marketing area. A satisfactory formula for the integration of farm activities and instruction objectives must be found.

A satisfactory formula for the integration of farm activities and instruction objectives must be found. "Close co-ordination" must be sought between the Faculty and Farm Director. Daily activity schedules must be developed so that students gain meaningful experience in caring for the farm's crops an animals. The students, and not the technicians nor the laborers, should bear primary responsibility for most of the farm work. The cleaning of stables and construction of livestock pens are the kinds of tasks students need to experience.

The faculty must take much care in the utilization of technicians in the educational process. They can perform useful service in the preparation of labs, in the caring for crops and livestock when students are on vacation, and making sure that equipment is properly maintained.

Students should participate in the demonstration process. Piglets should be held by a student while being marked, and then each in turn should mark one. The instructor should perform the first task whether it is a crop production or animal production skill being demonstrated.

Technicians and laborers must be accountable to a specific person in the performance of specific tasks, and the Dean of the Faculty must have the authority to make personnel decisions.

EXECUTIVE SUMMARY

Agriculture is the most important sector in the economy of Swaziland. It is made up of two sub-sectors, the modern and the traditional.

The Faculty of Agriculture has traditionally focused on providing people for employment in the Ministries of Agriculture and Education. The manpower demands of these ministries are slackening as positions have been largely filled.

Diplomates and graduates will have to look more to private industry for employment. They will also have to think more in terms of self-employment

Education at UNISWA will have to be more responsive to the requirements of the private sector.

The major agribusiness sectors are: sugar, citrus, forestry and products, cotton, pineapples, meat, dairy, tobacco, maize, and groundnuts.

Continued coordination will have to be carried out with these industries to provide the quality personnel they desire for staffing.

Strong instructional programs of a practical orientation need to be developed in the production of fruit crops. Avocado, banana, citrus, guava, mango, and pineapple crops should all play important roles in the future of the country.

The same can be said for livestock, beef, dairy, meat goats, and poultry. Broiler and layer programs in particular should be developed.

Field crops, maize, cotton, and groundnuts, will remain important. Others may show potential, oil seeds in particular.

Vegetable production is an industry that may become quite important if irrigation becomes widely practiced.

Thirty-two companies were interviewed, a lot of student demand information was developed. If appropriate training can be undertaken at Luyengo and closer ties established with agribusiness interests, employment opportunities will be available for diplomates and graduates for some time to come.

Adjustments in numbers will have to be made in the Agricultural Education area, particularly at the Diploma level. Agricultural Education and Extension should be offered together.

The Aims and Objectives of the Faculty of Agriculture should be altered to make room for objectives covering individual development in areas of marketable skills, and entrepreneurship, including management and its various facits. These objectives should also include the importance of off farm activities.

Students need to experience profitability. Funds need to be found to underwrite student projects. The University needs to establish a strong project system.

Improvements should be made to Luyengo lab facilities inorder that biological, chemical, and physical sciences can be taught from an agricultural perspective at this campus. Equipment in the other labs must be brought up to standard.

Student and instructor teaching schedules are overloaded. Students generally spend about 25 hours per week in class or laboratory work in a U.S. University allowing time for study, reflection, and individual projects.

The curriculum should be redesigned to allow for some common courses of a very practical nature. Students should complete two basic agricultural production areas and one specialty. This type of program will save staff and student time, and allow for some greater specialization which industry has called for.

Management, irrigation, and machinery skills in particular were emphasized by industry.

The University needs to establish more linkages with industry, research, extension, and other Universities.

The farm facilities need considerable repair. Fences need building to properly control livestock, and to prevent the loss of farm products from the school farm. The maize cribs need new wood and wire.

The feeding area for the dairy is totally inadequate. Weaning facilities should be built, and also corrals to control livestock around the spray race and weigh scale. A combination classroom - animal pavilion should be built in the animal area to encourage instruction with animals.

If sheep are to be kept, an entire sheep area with fencing and housing is required. The floor of the pig house requires resurfacing. The poultry housing requires renovation. Poultry cages need to be purchased.

The range livestock areas need developing. Watering tanks and pipe to transport water need installation. The area must be partioned into paddocks to allow for rotational grazing and establishment of new plant species.

The Animal Science department needs equipment to teach practical Animal Husbandry.

The Agricultural Education Demonstration Center is in need of a tractor, and improvements to its facilities.

The Home Economics facilities will need expanding to accommodate the new B.Sc. program.

The LUM department is in need of at least one large tractor and a complete set of auxillary equipment. Its lab needs renovation and upgrading

The old citrus orchard should be removed and a new one planted. Other species of fruit trees should be planted. Some area should be set aside for propagation of forest species if some educational work is mounted in that area.

At least two large shops must be built for educational purposes.

The University should concentrate on the development of its four year B.Sc. program. No advanced degree should be considered at this time.

The crop facility needs to be expanded for storage, and an area needs to be developed for the installation of grading and processing equipment.

Pumps need to be purchased for pressurizing the sprinkler systems.

A D D E N D U M

UNIVERSITY OF SWAZILAND, LUYENGO

1986/87 TIME TABLE

CLASS: B.Sc. Ag. Ed. III

SEMESTER

DAYS/HOURS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08.00-08.50	Soil Fert. 1st 7 wks Res. Lab. / Educ. Res. Methods 2nd 7 wks	Range & Pastures	Soil Fert. 1st 7 wks. Res. Lab. / Educ. Res. Methods 2nd 7 wks. Res. Lab.	Farm Machinery Res. Lab.	Soil Fert. 1st 7 wks Res. Lab. / Educ. Res. Methods 2nd 7 wks
09.00-09.50	Plant Propagation Res. Lab.	Crop Diseases and Weeds Res. Lab.	Plant Propagation Res. Lab.	Crop Diseases and Weeds Res. Lab.	Range + Pasture Res. Lab.
10.10-11.00	Plant Propagation PRACTICAL Biol. Lab.	Animal Health Res. Lab.	Introd. to Teaching Res. Lab.	Animal Health Res. Lab.	Introd. to Teaching Res. Lab.
11.10-12.00		Farm Organisation	Adult and Non-Formal Educ. Res. Lab.	Crop Diseases and Weeds Biol. Lab.	Animal Health Res. Lab.
12.10-13.00	Adult and Non-Formal Educ. Res. Lab.		Animal Health Res. Lab.		Farm Machinery Res. Lab.
	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
14.00-14.50	Soil Fert. 1st 7wks / Educ. Res. Methods Practical 2nd 7wks	Introd. to Teaching Res. Lab.	Farm Organisation Res. Lab.	Farm Machinery Practical	Introd. to Teaching Practical
15.00-15.50	Res. Lab.	Animal Health Practical	Range & Pastures Practical		Ed. Centre
16.00-16.50					

California Polytechnic State University Foundation
Animal Science Department, San Luis Obispo

ENTERPRISE CONTRACT

Enterprise No._____ Date:_____

Party of the First Part: California Polytechnic State University Foundation (hereinafter referred to as the Foundation)

Party(ies) of the Second Part:_____

_____

_____

_____

_____

1. This contract is entered into on this _____ day of _____, 19_____, between the above named parties for the purpose of instruction in agriculture.

2. Purchase of Stock. The party of the second part agrees to purchase from the party of the first part the following described livestock to be carried as a student enterprise under the supervision of the Head of the Animal Science Department or his representative.

Number	Breed and Description (or Weight)	Price per Head or Lb.	Total Price

Note for Swine Only: The final purchase price will be adjusted to _____ cents above the average selling price per pound.

3. Loan. The Foundation agrees to loan to the participating student(s) the total price, as stated in Paragraph 2, at an interest rate of _____% per annum from the date of this contract until the date that the principal amount is paid in full.

a. Interest shall be paid on the amount due during any given period of time, payments made on the principal being deducted from the principal at time of payment.

b. The participating student(s) agree(s) to provide a budget for this enterprise, which is to
before the loan is made.

4. Division of Profits. In consideration of the respective contributions of the two parties set forth in this contract and upon the presentation of a completed recordbook certified as correct by the Head of the Animal Science Department or his representative, net profits derived from this project shall be prorated on the following basis:

Two-thirds to the actively participating students of this enterprise. It will be the responsibility of the Enterprise Supervisor to prorate such profits to the party of the second part.

One-third to the Foundation, excepting as further conditioned by the statements appearing hereinafter.

5. Determining Net Profit. It is agreed by both parties that the following items are to be used in determining net profit:

Debit	Credit
Original cost of stock	All sales of project products
Feed costs	
Normal marketing expenses	
Interest on original total price	
Appropriate veterinary fees	
Other incidental expenses	

6 Labor. The party of the second part agrees to furnish all labor in connection with this project and, in the event some of this labor is to be hired, the cost of such labor is to be paid by the party of the second part and is not to be considered an expense of the project.

7. Exhibition at Fairs. Contractual agreements to be appended when applicable.

8. Net Loss on Project. In consideration of the division of net profits between the Foundation and the participating student(s) as shown in Paragraph 4, the Foundation agrees to assume any project loss and all overhead costs not otherwise covered in this agreement.

9. Partnership Projects. Should this project be conducted by more than one individual, the party of the second part shall be considered of being the following:

Name	Date Started	Share in Project

a. Individual animals making up a project shall not be assigned to individuals in the partnership, but to all partners, and they shall share as stated in Paragraph 9.

b. In the event an individual is assigned membership in a partnership project or in an individual project after it has been in operation for some time, his share in the profits shall be prorated on the basis of his percentage time and/or share of ownership.

10. Leaving School. Should an individual or a partnership member of the party of the second part leave school before completion of the project, such member agrees to forfeit all rights to profits from such project. Such share may revert to the party of the first part or be reassigned by the Enterprise Supervisor. Such member agrees to pay his prorated share of costs and loss.

a. A prorata share may be accorded the withdrawing party of the second part at the discretion of the Head of the Animal Science Department or his representative.

11. Responsibilities of the Students. The party of the second part agrees to:

a. Care for and feed his project stock in a careful and diligent manner under the guidance of the Enterprise Supervisor.

b. Maintain pens and equipment in good order and leave them upon the completion of the project in a condition approved by the Head of the Animal Science Department or his representative.

c. Maintain accurate records in an approved recordbook as required by the Animal Science Department.

d. Actively participate in Ag Enterprise meetings.

12. Bearing in mind that this project is operated strictly for instructional purposes, it is agreed by all concerned that the Foundation, through its agent,

the Enterprise Supervisor, will have complete control in matters of supervision, inspection, policy and contract adherence including the withdrawal of all rights and privileges of any or all of the partners represented by the party of the second part for mismanagement or neglect.

13. Additional Provisions. Party of the second part is to submit the completed recordbook(s) to the Enterprise Supervisor within _____ days after party of the second part receives the final tags for the enterprise. Failure to comply by participating student(s) will result in forfeiture of all claims to their share of the project.

14. This contract may be amended at any time with the mutual consent of all parties.

Signifying agreement with all provisions above outlined are the following signatures:

Party of the First Part _____
California Polytechnic State University Foundation

Party of the Second Part

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Approved:

_____
Representative, Animal Science Dept.

STATEMENT OF PLAN OF OPERATION

Composition of Main Feed Rations

Kind of Feed	Pounds of Feed in the Ration Ration No. _____	Ration No. _____	Ration No. _____
Total Pounds in Ration			

B E E F O R L A M B B U D G E T

Cost of Animal Purchased:

Total purchase weight _____# @ $_____/lb. $_____

(Total purchase weight_____# ÷ _____head = ave. wt. _____#

Est. Feed:

Ave. sale wt. (estimate)_____# minus Ave. Purchase wt. (above) _____#

=Ave. gain in weight _____# X _____head = Total gain in weight _____#

X Feed/lb. gain (discuss with instructor) _____# = Total feed _____#

Breakdown of Total Feed

Kind of Feed	Pounds	Price	Cost

Total Feed Cost _____

Other Expenses (estimate)

Transportation _____head @ $_____ $_____

Selling costs _____head @ $_____ $_____

Interest: Cost animals purchased $_____X_____days/360 @ 5%_____

Any other expenses (Medicine) _____

Total other expenses _____

ESTIMATED TOTAL COST (Excluding student labor) $ _____

Divided by Total Pounds to be Marketed (Ave.Sale wt._____# x _____head)

_____

= SALE PRICE PER POUND TO BREAK EVEN $_____