AN ABSTRACT OF THE THESIS OF

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Title: AN AGRICULTURAL CURRICULUM FOR THE COMMON CYCLE OF GENERAL CULTURE FOR RURAL HONDURAS

Abstract approved by _____
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Purpose

This study attempted to identify skills needed in agriculture for rural youth in Honduras, and to develop an appropriate agricultural education curriculum at the Common Cycle of General Culture (lower Middle School level) of the current educational system.

Methods and Procedures

Core competencies were identified by collecting information from 56 individuals representing: government technical personnel dealing with agricultural education, government technical personnel dealing with agricultural loans, and agricultural producers. The Pearson chi-square statistic was used to determine independence between sources of response and type of response. The curriculum model was based both on quantitative and qualitative information.

Findings, Conclusions and Recommendations

A high degree of consensus existed among technical personnel belonging to government institutions regarding agricultural skills perceived needed by rural youth in Honduras. Producers and technical personnel dealing with agricultural education tended to respond differently more often than any other group. Conclusions were presented by specific objective. Competencies were identified and listed for the Common Cycle of General Culture (lower Middle School level) and an appropriate curriculum was developed along with a program for its implementation. This curriculum considered basic skills, integrating different subjects into single courses and emphasizing practical aspects of production agriculture. Recommendations were developed for: 1) implementation of the new curriculum as an integral component of the Common Cycle, 2) a teacher preparation program, 3) an agricultural youth organization, and 4) program institutionalization.

An Agricultural Curriculum for the Common Cycle of General Culture for Rural Honduras

By

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AN AGRICULTURAL CURRICULUM FOR THE COMMON CYCLE OF GENERAL CULTURE FOR RURAL HONDURAS

I. INTRODUCTION AND LITERATURE REVIEW

The Republic of Honduras has traditionally been an agrarian country, and in the 1980s is still the least urbanized country of Central America. The vast majority of rural dwellers are small farmers who till their own plots or are landless laborers who work for wages on estates or small farms. Most of the independent small farmers raise subsistence crops, such as corn, sorghum, and beans. They supplement subsistence crops with small cash crops, such as coffee and bananas. Their holdings are typically five hectares or less (minifundia), and commonly located on marginal lands, particularly on the higher mountain slopes (Rudolph, 1984).

As the Honduran population and economy have expanded, it has become increasingly difficult for agricultural production to keep pace with the growing needs for food, raw materials, and export earnings. Because of the mountainous terrain and poor soils, only about 2.8 million hectares or one quarter of Honduras' 11.2 million hectares of land area,

are arable. In 1981, roughly two-thirds of these potentially agricultural lands were in use, and about one million hectares of which approximately 75 percent could be used as cropland, lay fallow, or in natural grassland (Ruhl, 1984). The use of land in Honduras as of 1980 was reported to be as follows: six percent as arable land, two percent as permanent cropland, 63 percent woodland, 18 percent meadows, and 11 percent for other uses (Statistical Abstract for Latin America, 1980).

Ruhl (1984) stated that the Honduran agriculture could be divided into three different productive sectors. The biggest of these is the traditional sector, composed of landowners of large estates and peasant farmers with very small holdings. Both groups use traditional backward agricultural techniques to raise livestock or basic grains for local consumption. This traditional sector has coexisted with a smaller but more efficient agricultural export-oriented sector that uses advanced technology. The third and smallest sector is made up of small agrarian reform groups, characterized by varied technology and production conditions.

The Honduran economy relies on its domestic agricultural production and there is a need to broaden agricultural development programs so that economic growth can expand throughout the country. Several obstacles have

to be overcome before this economic growth can become a reality. One of the major obstacles to overcome is the technological backwardness of the farming population of Honduras.

Statement of the Problem

The problem facing the rural population in Honduras is primarily the lack of skilled farmers. The educational system has not emphasized proper agricultural production technology at rural schools in the countryside. In fact, the educational system of Honduras has actually mistrained the human element by providing them with an education which has not taught men or women how to earn a living.

Traditional schooling has not provided those survival skills so greatly needed by peasants of the rural communities, nor has it enabled the people to develop resources and thereby raise their standard of living. One way to meet this need might be an agricultural vocational education program. Youth in rural schools would greatly benefit from agricultural vocational education programs which would focus on teaching them the skills necessary to improve agricultural production which in turn would improve the opportunities for employment and result in an increase of personal income.

Purpose of the Study

The purpose of the study was to develop an appropriate vocational agricultural education curriculum model for rural youth at the Common Cycle of General Culture, Middle School level, of the current educational system.

The proposed curriculum was aimed at upgrading the skills of future farm laborers so that they might be more efficient at producing cash crops on small land holdings to supplement their income or when employed they could be better mayordomos and/or more efficient laborers.

This study is unique in that it was aimed at upgrading the basic agricultural skills of subsistence farmers, mayordomos and farm laborers who have been overlooked in Honduras by training people for higher technical positions. It is also unique in that the landowner/producers have been asked to provide direct input as to the skills needed by laborers that could be employed on their farms. Common practice in the past when conducting such a study has been to survey only technical personnel, former students of technical schools, agriculture professionals, or people in private or public industries employing technical personnel rather than those persons who actually employ agricultural workers.

The curriculum itself was focused primarily on the producers' actual immediate needs but also considered future needs to upgrade the agricultural education of farm employees and subsistence farmers. Input from technical personnel in education, technical personnel in agricultural loan agencies, and from the author's personal agricultural knowledge and experience was used to provide balance and future direction to producer input.

Delimitations of the Study

This study was based only on the agricultural schools under the Ministry of Public Education from the Republic of Honduras, Central America. This excludes the agricultural schools under the Ministry of Natural Resources, the autonomous agricultural schools, and informal apprenticeship arrangements (father-son).

Specific Objectives

The specific objectives of this study were:

1. Complete a competency analysis to identify competencies required of rural youth to improve agricultural production as perceived by agricultural and animal producers, government technical personnel dealing with agricultural

education, and government technical personnel dealing with agricultural loans.

2. Develop curriculum appropriate to identified competency requirements.
3. Develop total program concept for implementation of curriculum.
4. Develop recommendations for implementation of:
   a. New curriculum in rural Middle School system.
   b. Teacher preparation program to meet needs of new program.
   c. National and local administration support of workshops to develop administrators' awareness of the high priority of vocational agricultural education programs for economic development in the rural regions of Honduras.
   d. Institutionalization of the vocational agricultural education program.

Definition of Terms

Agricultural production instruction: "The subject matter and planned learning experiences designed to develop knowledge and skills necessary for the production of plants and animals, and to provide practice in making managerial decisions in the science and technology of producing and marketing agricultural products." (Knebel and Richardson, 1982 p.5).

Agriculture and/or agri-business competencies: "Those required skills in and knowledge of animal science, plant science, soil science, agricultural mechanics, agri-business, farm and business management, leadership and human or personal relations." (U.S. Department of Health, Education, and Welfare, 1978, p.8).

Common Cycle of General Culture (Ciclo Común de Cultura General): The three years of Middle School that follow the primary education in Honduras. These three years are for exploring broader educational and vocational orientation. Courses taken are mathematics, science, Spanish, literature, and social studies.

Competency: "The behavioral characteristics of knowledge, skills, attitudes, and judgement generally required for the successful performance of a task(s) or the sum total of attitudes, knowledge, and skills which enable a person to perform efficiently and effectively a given function." (U.S. Department of Health, Education, and Welfare, 1978, p.7).

Dibble farming: Farming by utilizing the dibble or "pointed tool used to make holes in the soil for seeds, bulbs, or young plants." (Webster's New World Dictionary, 1968, p.406).

Mayordomo: A peasant who lives on the farm and takes care of "managing" it for middle and upper-class farm owners. They hire and fire labor, assign tasks, and report to the owner, but do not decide on financial matters regarding the operation of the farm.

Minimum Competencies: "The group of skills which must be mastered at minimal levels of performance prior to employment in an entry-level position within the world of work." (Skinkle, 1981).

Slash-and-burn: "Characterized or developed by girdling, felling, and burning trees to make land arable, usually for a temporary purpose." (Webster's New Collegiate Dictionary, 1973 p.1090).

Task or sub-competency: "A unit of work activity or operation that constitutes a logical and necessary step in the performance of a competency." (U. S. Department of Health, Education, and Welfare. National Ag Occupations Competency Study. 1978 p.8).

Vocational agriculture: Generally refers to the curriculum or program in agriculture designed to offer students the opportunity to explore and prepare for agricultural occupations (Knebel and Richardson, 1982 p.21).

Vocational education in agriculture: The systematic instruction in agriculture of less than college grade conducted in public schools for those persons who have entered upon or who are preparing to enter upon the work of the farm or the farm home (Phipps and Cook, 1951 p.19).

Vocational or technical high school: A secondary school organized for the primary purpose of offering education in semiskilled, skilled, or technical level occupations, as differentiated from academic and professional career objectives (Knebel and Richardson, 1982 pp.20 & 21).

Background Information on Honduras

The Republic of Honduras is roughly triangular or wedge-shaped in outline with an area of 112,088 square kilometers (43,277 square miles); it is the second largest Central American country (Pan American Union, 1968; McCamant and Flynn, 1987). Geographically, Honduras is divided into eighteen departments, and a Central District containing the capital of the Republic, Tegucigalpa (The Honduran-American Chamber of Commerce, 1985). Tegucigalpa is also the largest city and is tucked into the south-central highlands among the upland valleys of the country. Honduras is bounded on the north by the Caribbean Sea, on the east and southeast by Nicaragua, on the west by Guatemala, on the southwest by El Salvador, and on the south by the Gulf of Fonseca in the Pacific Ocean. About 80 percent of the nation's total area is mountainous terrain ranging from 300 to almost 3,000 meters in altitude. Honduras is the most mountainous country in Central America and is said to be the only one having no volcanos (Pan American Union, 1968). Some observers have described Honduras as the Tibet of Central America (Helms, 1984).

The basic topographic pattern of rugged interior highlands and relatively narrow coastal lowlands has

provided a dichotomy reflected in the dual social and economic patterns developed particularly between the North Coast and the interior (Rudolph, 1984). Morris (1984) stated that the agricultural economy has a dual nature: the subsistence aspect of the traditional forms, hacienda (medium or large estates) and minifundia contrasted with the modern export-oriented sector. He further explained that it was because of this dual system that much of the arable land in Honduras (15 to 30 percent of the total territory) was underutilized.

The traditional heartland of Honduras has been the interior highlands, that is, the western, central, and much of the southern part of the country, which compose about 65 percent of the national territory. Although rugged and mountainous, these relatively cool and dry highlands, were home for about 70 percent of the total population in the 1980's (Rudolph, 1984). Thus, the highlands have a concentration of the farm population in areas of relatively low land quality (AID, 1978).

The upland valleys which vary in size and in elevation from 300 to 900 meters are another dominant feature of the interior's landscape. The large valleys provide sufficient grass, shrubs, and dry woodland on their floors to support livestock and in some cases commercial agriculture. Subsistence agriculture has been relegated to the slopes of

the valleys with the limitations of small-sized holdings, primitive technology, and low productivity that traditionally have attended hillside cultivation (Rudolph, 1984).

Honduras features a variety of climates due to its location in the tropics and its varied topography (The Honduran-American Chamber of Commerce, 1985). Geographic configuration and latitude location combine to produce a climate in which temperatures and rainfall are determined chiefly by elevation. Temperatures in the highland region vary according to the elevation, and seasons are defined on the basis of rainfall. The rainy season lasts from May to November, and the dry season from December to April. Coastal lowlands are flat and normally hot and humid (Peterson, 1987).

Agricultural Production

Total agricultural production per capita declined nearly 10 percent between 1970 and 1981, and food production per capita fell 20 percent (Rudolph, 1984). Agricultural production diminished because most of the 16 percent of the land area used for agricultural production did not achieve maximum productivity with current poor agricultural practices (Rudolph, 1984). West and Augelli (1976) described the main characteristics of present-day Central American economic conditions when they stated that food

crops and techniques for subsistence cultivation have not changed very much since colonial, or even pre-conquest times. They continued by reporting that primitive slash-and-burn cultivation and dibble farming are very widespread throughout Central America. About Honduras, West and Augelli (1976, p.432) stated:

> The dibble, hoe, and machete are the [highlanders'] main agricultural tools, although southern Honduran subsistence farmers use wooden plows and oxen on gentle slopes and valley flats. Modified primitive slash-burn cultivation, with only two to three years of fallow after an equal period of continuous cropping, is typical practice on the mountain slopes...this has caused serious soil erosion; in some places, the complete removal of the topsoil has turned sizable areas into reddish-colored wasteland, fit only for scrub-pine.

Agriculture remained the most important segment of the Honduran economy in the early 1980s. According to the Yearbook of Labor Statistics from the International Labor Organization (United Nations, 1982), agriculture provided jobs for 59 percent of the employed labor force, the bulk of which was involved in production agriculture. Agriculture directly contributed about one-third of the Gross Domestic Product (GDP) of Honduras. In 1980, 62.1 percent of the total Honduran exports were from agricultural products (Statistical Abstract for Latin America, 1980). In 1982, 27.5 percent of the GDP total of Honduras was reported at U.S.$1.9 billion and was produced by the agricultural sector which is dominated by foreign trade (The Honduran-American

Chamber of Commerce, 1985). Commenting on the enormous economical importance that the agriculturally productive zones assume in Honduras, Ruhl (1984, p.103) said:

> It is not an exaggeration to state that the performance of the entire Honduran economy depends on the production and the export of a handful of agricultural commodities.

Population and Economy

The population of Honduras has shown a pattern of explosive growth during the Twentieth Century. Between 1950 and 1974, the population doubled and is expected to double again by 1995. In 1961, the total population was slightly under two million people. In 1980, the total population was approximately 3.6 million, reflecting an annual average growth rate of 3.6 percent (República de Honduras, 1984). For 1985, the estimated population was 4.3 million (The Honduran-American Chamber of Commerce, 1985). Average annual growth rate has been over three percent since 1961, and close to 3.5 percent since 1975, making Honduras the fastest growing country in Central America. Estimated average rates of increase are expected to remain above three percent to the end of the century, when the total population is estimated to reach 6.9 million (Helms, 1984). Helms (1984) and The Honduran-American Chamber of Commerce (1985) reported that since mid-century, the population of Honduras has become younger, with an average age of eighteen. The portion of the population under age 15 rose from 44.6

percent in 1950 to 46.9 percent in 1975. The projected percentage for the year 2000 is 43.2 percent under age 15 or approximately three million young people for whom educational services would have to be provided. These figures for 1980 to 2000 give Honduras the largest projected population under age 15 in Central America.

Poor food productivity has contributed to a very low standard of living in the countryside, where illness and poor diets are endemic (Rudolph, 1984). Income is extremely low for many in the countryside. In terms of 1978 U.S. dollars, the annual per capita income reported by Rudolph (1984) for landless rural families (constituting about 35 percent of the rural population) was $65; for the ten percent of families with less than one hectare of land was $82; for the 43 percent of families with more traditional-sized farms of between one and 35 hectares, $175, and for the ten percent who work on communal farms in agrarian reform programs, $138. Overall annual per capita income for the rural sector was $122.

McCamant and Flynn (1987) reported a Gross Domestic Product (GDP) of about U.S.$2.5 billion, or $650 per person for 1980. Daly Hayes (1983) reported the annual per capita national income (constant 1981 prices) as having declined from $708 in 1979 to $648 in 1982. The Honduran Government Economic Report to the Kissinger Commission in 1983 stated

that approximately 73 percent of rural families were in the lowest income stratum with personal incomes of less than $1,000/year, but, that they earn 49 percent of the GDP of Honduras, while in urban areas 19 percent of families are in this income stratum. These data show the inequality of the income distribution between rural and urban populations.

Deterioration of the mountain environment, poor productivity, and increase in the population result in poverty for the small farmer, and for the country in general. Therefore, it can be expected that as the total population continues to increase, population and resource pressures originating in traditional rural areas will remain the major motivations for population migrations within Honduras (Rudolph, 1984). Hardoy (1975, p.233) stated that in Latin America:

> Low agricultural productivity combined with isolation, traditional patterns of organization, and low living standards, all push people from the countryside toward the cities.

Due to the limited choice of life-styles and jobs, rural women usually go to the larger cities, to seek an escape from the likely fate of early motherhood and severe economic limitations that await them in the countryside. Most of these women seek work as domestics in middle-and-upper sector households, or as street vendors (Rudolph, 1984).

Helms (1984) blamed the exaggerated minifundia,

rudimentary agricultural technology, and low productivity of the traditional western and southern rural areas of Honduras as being significant reasons for out-migration by men to more dynamic agricultural areas and major population centers. Men, therefore, have tended to emigrate mainly to the North Coast in search of better jobs (Helms, 1984). The same author pointed out that in the cities the industrial and commercial sectors of Honduras have not been able to create jobs at a sufficient rate so as to absorb the stream of migrants from the rural areas.

Hardoy (1975, p.233) stated that in Latin America "miserable living conditions and lack of rural opportunities stimulated rural-urban migration." Hardoy (1975) further explained that the urban-rural gap in opportunities and living conditions make cities, particularly national capitals, the goal of country dwellers and inhabitants of small towns. Honduras has two main cities, the capital city, Tegucigalpa, and San Pedro Sula on the North Coast. The bulk of country dwellers have also tended to go to the North Coast because the banana plantations there have given the peasants better job opportunities, particularly in the past.

Di Venuti (1962) and Torres (1979) reported that in 1950, 83 percent of the economically active population was engaged in agriculture, and by 1961 only 66 percent of the

same population was engaged in agriculture. "Economically active" population was defined in 1961 and previously, as persons 10 years of age or older. Since then this definition has been changed to include only persons 12 years of age or older (Torres, 1979). In 1974, only 65 percent of the population was engaged in agriculture (República de Honduras, 1974). The Agency for International Development (1978) reported that for 1978, 68.8 percent of the entire Honduran population was engaged in agriculture. In 1981, 59 percent of the economically active labor force was working in agriculture (United Nations, 1982).

Although the numbers of the active labor force appear to decline there are many people left in the rural areas who are wholly engaged in agriculture. Yet, they are not able to produce beyond the subsistence level, in part because of the primitive agricultural techniques utilized.

Webb, Balweg and Fougere (1982) stated that increasing production of cash crops in the developing countries may be a necessary component of the development process and thus should be the main focus of agricultural training. It would be an asset for the future farmers of Honduras to have agricultural vocational schools to teach them generalized agricultural skills that will improve their agricultural methods in order to increase the production and income of their farms.

Illiteracy

In a 1980 survey of "campesinos" (peasant farmers) it was found that only about six percent had completed six years of primary education. Yet, even for those who had completed six years, learning development was still at a rudimentary level, and they were only beginning to acquire the knowledge and attitudes that could eventually assist in development (Rudolph, 1984). Millet (1984) reported that in 1958 nearly two-thirds of all Honduran adults were still illiterate despite a government literacy program.

Nationwide illiteracy currently stands at 50 percent. The illiteracy rate for women is reported to be higher; approximately 40 percent of the female population have had no education at all (Peckenham and Street, 1985). Durham (1979) in a survey done in the rural community of Langue, Department of Valle, in the southern part of Honduras, reported an illiteracy rate of 72.6 percent among men, and 73.1 percent for women.

Only 44 percent of the children in primary school are girls, and by the time they reach university age, fewer than 25 percent of the graduating students are women (as compared to 42 percent in the USA, and 52 percent in the USSR) (Peckenham and Street, 1985). The vast majority of the educated Honduran women are not from the rural areas because "education remains the prerogative of the middle and upper sectors" (Rudolph, 1984, p.90).

Education

Hardoy (1975) described both the primary and secondary education of Latin America as underdeveloped, and the technical training, together with the preparation of middle level professionals, as substandard and unattractive to youth. He also stated that even the universities continued to stress law and the humanities over engineering and the sciences.

Holmes and Scanlon (1971) stated that education created new, socially privileged elites, and widened the gap between those who are able to survive in the system and those for whom education is a personally frustrating experience, raising hopes with promises which cannot be fulfilled. Establishing agricultural vocational programs for both men and women throughout rural Honduras would offer agricultural improvement, reform, and survival skills in today's social system. Expected outcomes of increased agricultural production and improved employment opportunities would be the encouragement needed by young men and women to remain in the countryside and thus contribute to the improvement of their quality of life.

An educational program is wanted that will make the public educators of Honduras more aware of the needs of the country's rural youth. There is a particular need to relate education to rural development. Holsinger and Theisen

(1977) in their study of the schooling-modernity nexus found that formal schooling was a vital force in the process of national development. Also, that education was the single most important variable affecting an individual's personality and disposition. They stated that formal schooling gave the individual:

> A strong sense of social and personal efficacy, a positive valuation of time, a willingness to accept new ideas, a desire to participate actively in communal and political affairs, and a conviction that the national application of scientific principles and technology can solve a wide range of human maladies (Ibid., p.333).

Public educators of Honduras also need to acknowledge that changes have to be implemented in agricultural education. As Calhoun and Finch (1976) maintained, public education's major objective should be to prepare individuals to make a living and not to prepare individuals for living.

In Honduras there is need in education for both making a living and living. It must be recognized that agriculture should be held as important as the rest of the technological careers, and that it is more than mere farming. Agriculture includes all aspects of producing, processing, servicing, and distributing agricultural products. Servicing is used in the sense of providing supplies and services to all these aspects of agricultural production. Knebel and Richardson (1982, p.6) defined Agriculture as:

> The broad industry engaged in the production of plants and animals for food and fiber, the provision of agricultural supplies and services, and the processing, marketing, and distribution of agricultural products.

Well planned participation of youth in vocational agricultural education should prepare rural youth for the vocation of farming and agribusiness, and should educate them not only in the skills and abilities needed for field work, but also for management, marketing, and planning. Women's responsibilities are particularly broad in rural areas and range from cooking and household chores, to cultivating small plots and raising domestic animals (Peckenham and Street, 1985). Chickens, swine, and sometimes goats and rabbits are raised by women to supplement their family's diet. Vocational programs should help young rural women improve their educational and their agricultural level of skills. Another outcome should be to improve their self-image and self-worth, and undergo change from a passive role in society, particularly in the rural areas, to a more active and meaningful participation in the family's economic stability and in community life.

Young people in the rural areas should receive true-to-life training in their natural setting in agricultural vocational schools, on their farms, and in the communities where they live. It is important that their agricultural training should not alienate them from their communities. Rather, it should make them aware and better acquainted with its socio-economic structure so that they can in the future play an effective role in those communities. The schools

should help young people become aware of their environment and the place they occupy in it. Paolo Freire (1972) wrote about the concept of conscientization. Conscientization refers to the process of awakening individuals to the awareness of themselves, of their environment, and the place they occupy in it. It also refers to the forces which are acting on them, and provides a framework and techniques by which individuals may become active subjects in social processes.

In Honduras, the vocational agricultural schools should carry out this conscientization and provide the developmental education so greatly needed by the rural youth in the whole country. Friedmann (1975) stated that a strategy for extending development assistance to rural or provincial areas was to expand the educational opportunities (secondary and technical) and make the curriculum more immediately relevant to local needs. Ruttan (1984, p.44) stated that:

> Productivity differences in agriculture are increasingly a function of investments in scientific and industrial capacity and in the education of rural people rather than of natural resource endowments. The effects of education on productivity are particularly important during periods in which a nation's agricultural research system begins to introduce new technology.

Miller (1985, p.118) in his publication of Principles and a Philosophy for Vocational Education stated that:

> Vocational students should be prepared for the world of work not only by having skills that will get them jobs, but also by knowing how to work. They need to know how to apply for a job, how to be reliable workers, how to get along on the job, how to give their best to their job, and how to grow in their work by developing personal skills and abilities.

Vocational education can promote the general welfare of the nation. Barlow (1981, p.21) saw vocational education as a social necessity and he stated that it is "deeply concerned with developing the people's economic potential." Barlow (1981) also thought that vocational education could provide people with an opportunity in the world of work.

The System of Education in Honduras

Education in public schools in Honduras is the responsibility of the Ministry of Public Education. Honduras has a central government and policies in education are defined at the national level from the capital of the Republic, Tegucigalpa.

The educational system may be broadly divided into three categories:

1. Primary Education (six years)
2. Middle or Secondary Education
   a) Common Cycle of General Culture (three years)
   b) Diversified Cycle of variable duration of not less than two years and which may be divided into:

i. Secondary Education (two or three years)

ii. Normal School (three years)

iii. Vocational Education (variable duration)

iv. Artistic Education (variable duration)

3. University Education

Primary Education: There are six grades in primary school, and children start school at the age of seven. Public education is the responsibility of the State, and is free and compulsory. Although education is theoretically compulsory for children between the ages of seven and twelve, the law is not very strictly enforced because of the shortage of schools (Crow, 1987). Education is free, but all the materials (pencils, notebooks, textbooks, etc.) must be purchased by the student. Uniforms and shoes are strongly recommended. It is most difficult for poor rural families to handle these expenses, especially where there are several children of school age.

The number of rural schools has grown markedly, yet there is still a large number of small communities so isolated in terms of communication with the rest of the country that if they have a school at all, instruction is only up to the third grade (Rudolph, 1984). Millet (1984) reported 1,879 rural primary schools in 1957, and he also stated that most offered only three years of instruction.

Students wishing to continue studying must leave their homes and communities to attend school elsewhere. Millet (1984) estimated that in Honduras 39 percent of school-age children were enrolled in the primary schools, but that the average attendance was much lower. He then cited that only 48 percent of all Honduran children enrolled in first grade made it to the second grade and only nine percent made it to the sixth grade. In the rural areas, the percentages of those enrolled in school were 33 percent for second grade and only one percent for the fourth grade.

Drop-out rate is high, particularly among boys 11 to 12 years old, from the fourth grade on, for they are forced to seek work to help ease the family's financial needs (Rudolph, 1984). The attitude of the rural community towards education is that of skepticism. Formal schooling has not helped in raising their standard of living, nor have they seen any economic growth or the economic development of their communities brought forth by formal schooling. Therefore, a great number of parents of school-age children believe that "school attendance is unnecessary beyond that available in the village" (Helms, 1984, p.83). Several problems are cited as encountered by the Peace Corps Volunteers assigned to work with the rural pilot schools in Honduras. These include the lack of interest on the part of parents concerning their childrens' education, the lack of

academic middle schools as well as trained teachers, and the need for manpower in farming communities (Peace Corps/Honduras, 1985). The Peace Corps continued reporting that almost 40 percent of the children that complete the sixth grade do not go on to high school.

Crow (1987) stated that in Honduras the spread of education has been hindered because of political disturbances and lack of transportation. The same author reported an illiteracy rate of about 48 percent for the adult population in 1979. Rudolph (1984, p.83) reported that:

> Most students that officially attend school are still illiterate when they leave, and the average educational level in rural Honduras is less than the equivalent of second-grade education in the United States.

He also reported that the educational content in the Honduran school system has traditionally focused on subjects such as history and language rather than on topics of more relevant immediate survival value, especially for the poor rural population (Rudolph, 1984). A project description by the Peace Corps to inform their Volunteers about the rural pilot schools in Honduras stated that primary education usually failed to provide rural children with practical skills and knowledge in food production, nutrition, homemaking, health, and the use of simple tools that would help the poor to improve their living standards and techniques (Peace Corps/Honduras, ND). Basic education

throughout Honduras has mostly emphasized writing, reading, Spanish grammar, history, arithmetic, and geography.

The Ministry of Education recognized that there was a lack of appropriate education at the primary school level in Honduras and expanded the educational curriculum to include topics relevant for the rural peasant farmers. Rural pilot schools were created to introduce appropriate agricultural skills and technology to elementary teachers, students, and nearby farming communities (Peace Corps/Honduras, 1985). For education, demonstration, and production purposes, the pilot schools established small projects such as small mixed gardens, animal husbandry, apiculture, construction, and swine, chicken, and rabbit raising. The typical rural pilot schools have had seven or eight full-time teachers plus a school director, and generally have one to two manzanas (3.4 to 6.8 acres) of land. The enrollment generally has been around two hundred and twenty students with the largest classes being the first, second and third grades. In one area five satellite schools with a total of ten to twelve teachers working at them, offered classes up to third or fourth grade (Peace Corps/Honduras, ND).

In the Peace Corps' "Description of Rural Pilot Schools" report it was stated that few projects were large or well organized and tools and equipment were limited. In some instances a sewing instructor and/or a person fairly

knowledgeable in agronomy worked at the school. Rather less had been done so far at the satellite schools because their resources were more limited than those available to the pilot schools, so project developments were more selective and on a smaller scale. The report continued by saying that the schools and Volunteers have received less than adequate support from the Ministry of Education. The consequence of this lack of support was a lesser overall educational level of the rural peasant. Nonetheless, it was this type of school that was greatly needed throughout rural Honduras to upgrade skills and the standard of living (Peace Corps/Honduras, 1985).

Crow (1987) reported that in 1980 there were 5,568 primary schools with a total of 16,600 teachers and 582,600 students. In 1986 there were 6,710 primary schools with a total of 20,732 teachers and 805,504 students (República de Honduras, 1986).

Middle School Education: After completing the sixth grade students who wish to continue studying enroll in what is called the "Common Cycle of General Culture" (Ciclo Común de Cultura General) for three years. These three years are for exploring broader educational and vocational orientation. Courses taken are mathematics, science, Spanish, literature, and social studies. After completing the three years of the Common Cycle students choose their majors and start the

"Diversified Cycle" (Ciclo Diversificado) to continue secondary education for two or three more years, depending on the career they choose, or go to the Normal Schools for teacher preparation.

The Diversified Cycle is divided into three categories: Secondary Education, Vocational Education, and Artistic Education. The objective of what is called Secondary Education is the formation of High School Graduates in Sciences and Letters (Bachiller en Ciencias y Letras), equivalent to High School in the United States. These are the students who will attend the university after they have finished their schooling. Vocational Education's objective is the formation of middle level professionals in the areas of animal science and agronomy, industrial and handicraft education, commercial education, social services, home economics, and other professions deemed necessary for the development of Honduras (Congreso Nacional, 1966).

The Normal Schools for teacher preparation are part of the Secondary Education program at the Diversified Cycle level. The teacher preparation program consists of three years after which the students get a diploma as Elementary School Teachers. As part of their teacher preparation program students take a few hours of general agriculture but, they do not specialize in agricultural education. No emphasis is placed on applying scientific or mathematical

information through the media of agriculture. The Normal Schools prepare teachers to teach traditional subjects. After completion of the Normal School program, the Elementary School teachers can attend the Superior School for Secondary School teacher preparation (Escuela Superior del Profesorado "Francisco Morazán") located in Tegucigalpa.

In 1980 there were 254 secondary schools throughout Honduras with a total of 4,400 teachers and 125,000 students (Crow, 1987). The Honduran annual statistical report stated that for 1986 there were 370 urban secondary schools, and 58 rural secondary schools, making a total of 428 secondary schools throughout Honduras, with a total of 6,945 teachers, and 171,998 students (República de Honduras, 1986).

Ruttan (1984, p.44) stated that in an agricultural system characterized by static technology there are few gains to be realized from education in rural areas. He continued by saying that:

> Rural people who have lived for generations with essentially the same resources and the same technology have learned from long experience what their efforts can get out of the resources available to them. Children acquire from their parents the skills that are worthwhile. Formal schooling has little economic value in agricultural production.

William and Paul Paddock (1964, p.71) clearly stated: "Cut the Nonsense Out of Education." They then stated that hungry nations cannot afford elaborate educational programs fit for rich developed nations, nor can they afford

education along lines of self-contentment for both are unaffordable luxuries. They continued by stating that the Minister of Education must emphasize that each course be oriented toward inculcating the students with the importance of resource development, and training them to know how to develop the nation's resources. And, most importantly, they stated that the course must be designed for students living in a rural economy, and adaptable to any part of a country with its own problems of climate and terrain and stage of agricultural development. Curle (1966) stated that there is evidence that schools are often the conservative elements in society and that they reinforce and preserve the actual social system. Thus, they are not major factors that actually contribute to the development of the child and, as such, schooling cannot incontrovertibly be declared a "good thing."

Helms (1984) reported that in terms of the total population only 35 of every 1,000 students who entered the first grade, would finish the secondary school, and only one would obtain a university degree. The 1974 Census of Honduras showed the educational levels for the population as being: 41 percent with no education at all; 29 percent with one to three years; 23 percent with four to six years; three percent as having seven to nine years; three percent as having ten to twelve years, and only one percent as having

more than twelve years of formal schooling (República de Honduras, 1974).

Rudolph (1984, p.82) reported that the functional literacy rate in rural areas was about 25 percent in the early 1970's but by 1980 had reached 45 to 60 percent in some regions. These figures reflect a lack of primary and of secondary schools throughout rural Honduras. Because the primary rural pilot school program has not been completely implemented throughout Honduras, nor does it always fulfill the role it was intended to play, this study has chosen the Common Cycle of General Culture, lower Middle School level, to emphasize agricultural education. It is also imperative to establish more lower level Middle Schools with a primarily agricultural emphasis in the rural areas to support and improve the agrarian basis of the Honduran economy.

Agricultural Education for Less Than University Level:

Agricultural education for less than university level is the responsibility of the Ministries of Public Education, and of Natural Resources. This study will deal only with the agricultural schools under the Ministry of Public Education. Agricultural education schools are technical schools, and are therefore considered under Vocational Education at the Diversified Cycle level.

Entrance requirements at the agricultural schools in Honduras include completion of Primary Education, and the completion of the three years of the Common Cycle of General Culture. The Agricultural Diversified Cycle has a three year duration. Prior to 1985, after completing the first two years of this Cycle the student graduated with a High School Technical diploma (Bachiller Técnico). After three years of general agricultural studies the student graduated with an Agricultural High School diploma (Bachiller Agrícola). The students then chose to remain in the school for another year (total of 4 years) where they would major in Agronomy or in Animal Science. They would graduate as "Agricultural Technicians" (Técnicos Agrícolas) or as "Livestock Technicians" (Técnicos Agropecuarios) (República de Honduras, 1979). The difference between high school graduates with an agricultural emphasis (Bachiller Agrícola) and "technicians" is that the former are generalists and the latter are especially oriented toward livestock or toward agronomy, and would be in a better position to act as assistants to the university agricultural professionals (República de Honduras, 1979).

In 1985, the structure of the Agricultural Diversified Cycle was simplified whereby only one degree was to be conferred. The degree would be that of Technical High School graduate (Bachiller Técnico) in the major chosen.

This sole degree would serve a dual purpose: to prepare the student for technical education and/or university education, or to prepare the student to be incorporated into the world of work as technical personnel (de Mello Barreto, Guillén, and Tábora Muñoz, 1985).

Traditionally, the main income sources for the Honduran farmers have been cattle raising and cash crop cultivation. Cattle production is one of the best sources of income in the southern, east, north, and northwestern areas of Honduras (Secretaría de Cultura y Turismo, 1983). The cattle industry is an important component of the economy. Meat sales usually constitute Honduras' number three or number four source of export earnings (Ruhl, 1984). As a consequence of the economic importance of cattle raising and cash crop cultivation, the main agricultural training areas have been animal science and agronomy.

Currently, there is great concern on the part of the government about the quality of Agricultural Education in Honduras. A sub-committee on human resources was appointed to evaluate the Agricultural Education in Honduras and part of their findings was reported in the Honduran newspaper "La Tribuna" in April, 1987. The study revealed that the current Agricultural Education in Honduras consisted of a series of isolated and uncoordinated activities carried out by seven institutions. These have as a common denominator

only their characteristic as an educational institution for the formation of professionals and technicians in the agricultural sciences. It was further revealed that in all agricultural fields there is a lack of properly trained personnel both in the private and in the public sectors. Thus, and most importantly, it was concluded that there is a great need for a solid educational program which would provide a rigorous technical training in agriculture. Therefore, as a short-term alternative solution, the Honduran Government has chosen to create a single institution which would organize, administer, guide, and finance all of the agricultural education in Honduras (Anonymous, 1987). Since there is agricultural instruction at the elementary and at the Diversified Cycle, and since 1985 only one school at the Common Cycle level was trying to introduce agricultural education, this study focused on the Common Cycle of General Culture.

Helms (1984) stated that in Honduras, the number of civilian professional, managerial, and technical personnel has remained very small, and that it is either insufficient or inappropriate for the country's needs. Morris (1984) cited the underskilled labor force as one of the causes for a slow rate of industrial expansion in Honduras. Even though schools, health facilities, and similar social services have increased, the delivery of those services has

been hampered by the lack of skilled technicians. The same underskilled labor forces are found in the countryside. Daly Hayes (1983) in her report to the 97th Congress 2nd Session of the Senate of the United States expressed the following regarding her visit to Honduras:

> Honduras has a very thin layer of skilled managerial and technical manpower. Until the basic level of education in the country is improved, this will continue to be a serious drag on the country's growth potential.

Ruhl (1984) stated that the great majority of Honduran workers are unskilled, poorly organized and underemployed in the least modern and least productive sectors of the economy. Millet (1984) reiterated the fact that in Honduras human resources are limited. One of the recommendations of the Presidential Agricultural Task Force that visited Honduras in 1982 was to "upgrade agricultural education" (Rudolph, 1984, p.132). The Peace Corps mimeograph to their Volunteers (Peace Corps/Honduras, 1985) stated that:

> At this time the Ministry of Education does not have the technical, human or financial resources to implement this program (the rural primary pilot schools) completely.

Because of the agrarian nature of the Honduran economy, the priority should be rural vocational agricultural education. This education should be offered in the countryside where it could start preparing students to become some of the skilled managerial and technical manpower

that is lacking and is so needed in Honduras. Daly Hayes (1983) foresaw a considerable production potential for Honduras, but for this to become a reality the rural educational system would need an agricultural emphasis.

In the United States the federal government has supported vocational education legislation since the beginning of this century. The final report of the United States Commission on National Aid to Vocational Education (1914) found that vocational education was a way to prevent a waste of human labor, to increase earning power, to offset the increased cost of living, and to achieve higher standards of living as a result of better education. Prosser and Quigley (1950, p.454) cited Charles R. Allen as stating that:

> The purpose of vocational education is to help a person secure a job, train him so he can hold it after he gets it, and assist him in advancing to a better job.

Prosser (Prosser and Quigley, 1950) himself stated that one of the principal needs of many workers is technical knowledge relating to their occupations. Further, there is an opportunity for vocational education whenever a worker needs skill, knowledge, or information in order to do his/her work properly. Byram and Wenrich (1956) stated that the key to the problem of sufficient food and fiber for future generations is education in abilities needed by farmers. Burns (1975) stated that there is both a growth

component and a welfare component in the social role of education. Adiseshiah (1968) stated that education promoted development in two ways. First, education provides the specific skills needed for the proper performance of a number of occupations. Second, it creates, influences, and conditions the socio-cultural framework which is an indispensable element of the infra-structure for development. The same author continued by stating that education was also part of the welfare component in raising the levels of the living standard which are, after all, the goal of all development.

As background information for both Honduras and the Honduran educational system, it is important to acknowledge the fact that the majority of farms in Honduras are "managed" by "mayordomos". The mayordomos are rural peasants who have some sort of primary education or, if they lack that, have experience taking care of animals and crops on farms. Because owners of medium and large farms do not live at the farm, the management is done by these untrained peasants who are generally unskilled laborers. It is due to the lack of proper schooling of the mayordomos that owners of the farms make all of the financial decisions regarding their operation. If the future mayordomos can be provided with vocational agricultural education, these farms would be more productive and efficient. True farm management could

then be transferred from owner to mayordomo. In addition the rural youth who have access to their own plots could go back to work them and because of their agricultural education they would be better off than their parents. As skilled agricultural labor they could improve their quality of life and increase real income for their families.

The U.S. Office of Management and Budgets offered a comprehensive definition for quality of life in a book published by the Environmental Protection Agency (1973, p.II-291) and reported by Ledebur (1977, p.11):

> Quality of life objectives are: good health and long life, freedom from crime and fear of crime, sufficient education to make the most of one's abilities, the ability to work at a job that is satisfying and rewarding, income to cover the necessities of life with opportunities for improving one's income, housing that is comfortable within a congenial environment, and time and opportunity for discretionary activities.

Hartley (1977, p.113), stated that "...economic vitality underlies quality of life." A result of a more practical education would be the economic growth for rural areas. Economic growth in an area can most certainly be followed by an economic development. Economic growth is defined as an increase in the total value of goods and services, and in employment earnings and opportunities within a region (Ledebur, 1977; Paul and Carlos, 1981). Economic development is defined as a planned sequence of programs and activities designed to improve the "quality of

life" in a region or a community; it is the process of expanding the productive capacity and improving the overall welfare of the citizens of a region (Ledebur, 1977; Winnie, 1977; Bruno and Wright, 1980; Paul and Carlos, 1981).

The first steps in planning any program are to identify needs to be met and to determine ways to meet those needs. By using an appropriate survey, minimum competencies for the mayordomos could be identified. Based on the survey results, a curriculum could be structured so that the future mayordomos would become skilled managers of more productive and efficient farms.

It is important to note that other Central American or United States' curricula would not be appropriate for application in Honduras for various reasons. Agricultural curricula in Central American countries are currently provided for upper secondary level and university level students but not for lower middle school level students. Thus, only the most academically and financially capable students receive an agricultural education. Promoting relevancy in education for lower level Middle School students in rural Honduras would be accomplished by incorporating agricultural subjects into these grade levels of the school curriculum. This type of incorporation has not been done formally in Central American countries and,

therefore, any current curricula would be inappropriate for education in the lower grades.

Even though there are numerous agricultural curricula in the United States for secondary level vocational agricultural programs they would also be inappropriate in Honduras. The level of technology for production agriculture in the United States is not only considerably different than that of developing Latin American countries but it also is at a higher level. The actual vocational agriculture curricula in the United States is Agribusiness oriented. Curricula for Honduras needs to be practical and production agriculture oriented as opposed to a heavy theory oriented curriculum. The kind of practical application that was present in 1917 in the United States with the passage of the Smith-Hughes Act is needed in Honduras. Hoeksema (1987) stated that for underdeveloped nations the direct transfer of technology from the United States produces detrimental effects in most cases. That it leads to an atrophy of the inventive process and encourages technological dependence rather than development.

II. RESEARCH METHODOLOGY

The purposes of this study were to identify skills needed in agriculture for rural youth in Honduras and to develop an appropriate agriculture education curriculum at the Common Cycle of General Culture, lower Middle School level, of the current educational system. The procedures outlined in this chapter were followed to satisfy these purposes.

This study employed both qualitative and the quantitative methods to understand the perspectives of three groups which exert an influence on agricultural education in Honduras. It is a qualitative study in that it describes and presents an understanding of a social situation both from the author's experience and from individuals interviewed (Taylor and Bogdan, 1984). The quantitative method was used in the opinion poll of the three groups.

The final curriculum model would be based on quantitative information considered in the context of qualitative data. For this particular study, the mix of quantitative and qualitative input was appropriate for generating a curriculum model that would have the broadest general support.

In order to identify some of the basic skills needed in agricultural education, the author, a native Honduran, made a 30-day on-site visit to Honduras (after a ten-year absence to study agriculture in other countries). Three agricultural schools and six farms were visited. Twenty government personnel who dealt with agricultural education, and ten government personnel who dealt with agricultural loans were interviewed. An in-country literature search supplied information on agricultural curricula, programs, statistical data, educational laws, and other pertinent information.

Strategy and Implementation

Curriculum was developed using a procedure and input format as follows:

1. A literature search was conducted using the Library Information Retrieval Service (LIRS). The search included:
   (a) agricultural instruction programs from Honduras, Latin America and developing countries, and
   (b) curricula and content from Honduras, Latin America, other developing countries, and the United States.

2. Personal observations were made and 30 in-country interviews were conducted in August, 1986 by the author who as a native Honduran and Animal Scientist had previous personal knowledge of the agricultural situation of Honduras. This led to
   (a) reinforcement of previous understanding of the agricultural situation in Honduras, and
   (b) gathering of new information through visits to government institutions, agricultural schools and farms.
3. Curriculum information was gathered from the Diversified Cycle (upper level) agricultural instruction program for articulation purposes.
4. Visits were conducted to six farms, to two government institutions dealing with agricultural education, and to two government institutions dealing with agricultural loans for informational purposes.
5. Economic value of leading agricultural commodities used as basic food and export was considered. These correspond to the first five areas included in the questionnaire (Appendix A), which were based on the 1986 curriculum of the Middle Agricultural School "Reynaldo Salinas López" of Jacaleapa, Honduras. This school was founded in

1985 and is the only one in Honduras which has as its objective the education of rural youth in agriculture and home economics. It is functioning on a four-year basis, even though the lower level cycle is traditionally only three years long.

The Twelve-Step Curriculum Development Procedure (Cole, 1982), was another strategy used for curriculum build-up. The steps are:

1. Focus program goal. For this study the goal was to build an agricultural curriculum for the Common Cycle of General Culture (lower Middle School level) whose emphasis was practical rather than theoretical. This would give Honduran youth the agricultural skills required for improved production.
2. Identify key agricultural occupations. Because this curriculum was to be designed for the rural lower Middle School level the focus of the study was on subsistence farmers, mayordomos and farm laborers who hold key agricultural jobs but who are left untrained by regular schooling.
3. Identify core competencies. These are the basis of the program and are those which students at the end of their study should possess. Identification of core competencies in this study was done through the results of the competency-based questionnaire.

4. Group competencies into units of instruction. When the curriculum was developed, grouping was done so that common subjects fell into a logical sequence.
5. Write students' performance objectives. These are derived from the core competencies and should be identified for a specific locale and program by each agricultural teacher.
6. Determine scope and sequence. In determining the scope or how much to encompass in a unit, this study took into account the level of the students, their age and maturity, and their previous knowledge, keeping in mind the practical training the curriculum would offer. The order or sequence in which the units should be taught within one year as well as across the three years of the Common Cycle of General Culture was determined by the level of difficulty of each unit.
7. Develop a unit calendar. A unit calendar gives the teacher a plan for proceeding on a monthly or on a yearly basis. For this study the unit calendar was planned on a yearly basis with time allocated for each unit. Time allocation was calculated on a percentage basis to allow individual instructors flexibility in decision making. Thus time for specific units could be allocated according to regional needs.

8. Develop unit plans. In identifying the unit plans appropriate to this curriculum consideration must be given to class level, the number of periods taught per day, the instructional materials required for a unit, and the references available. This activity must be done by local teachers.
9. Filing the lesson plans. Teachers should develop a filing system that works for them so that material is readily available when needed.
10. Teach with enthusiasm. Agricultural teachers should teach each subject matter with enthusiasm to get students interested and involved in the agricultural fields.
11. Continuously review the units. The agricultural teachers should critically review the curriculum on a yearly basis using community input to determine whether progress was made.
12. Continuously revise and refine material. The curriculum should be amended, improved, deletions made and up-dates inserted consistent with the findings of the annual review process.

Development of the Instrument

Following the identification of the problem, efforts were concentrated on the development of an instrument for the identification of competencies required of rural youth to improve their agricultural production skills. In order to obtain pertinent information, it was decided to base the competency identification process on the 1986 curriculum of the Middle Agricultural School, Instituto Tecnológico "Reynaldo Salinas López" of Jacaleapa, Department of El Paraiso, Honduras. This school was chosen because it is a new school which is trying to aim its curriculum toward the lower Middle School level in four years of study, even though the lower level traditionally has only three years.

The instrument for identifying the competencies required in this study was specifically designed for Honduras. Its development was supplemented by the vocational education "Agriculture and Agri-Business Task Inventory" developed by Fancher (1987), and by the agricultural "Needs Assessment" instrument (Fancher and Herren, 1986) designed for the Faculty of Agriculture Sub-Project of the University of San'a, in the Yemen Arab Republic. A questionnaire was developed from these sources and was first written in English. This draft questionnaire was submitted to a group of experts with international

experience made up of three Agricultural Teacher Educators and two Vocational Agricultural Teachers at Oregon State University.

After corrections and modifications were made, the questionnaire was translated into Spanish prior to submitting it for pilot-testing and validation of the competencies. Before sending the translated questionnaire to be pilot-tested, the competencies were also reviewed in Spanish by three Latin American animal science specialists and two crop science specialists all with international experience at Oregon State University. The objective of these reviews was to ensure that the list of competencies was relevant, complete, free of item duplication, and to clarify wording. Additions made by the Latin American group filled voids left by the investigator and the literature review. The preliminary questionnaire was divided into five areas: (a) Major Species (Beef and Dairy Cattle) (b) Minor Species (Swine, Poultry and Rabbits) (c) Basic Grains and Industrial Crops (d) Horticulture and (e) Pomology. Since most farm work and cattle handling is done on horseback, a section on horses was included at the end of the Beef and Dairy Cattle area.

The following instructions were written on each of the five areas of the questionnaire given to the pilot test

participants and also to the final representative sample participants:

> This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

As a result of the pilot test, a section on Personal Skills was added to the questionnaire. The following instructions were given in the area of Personal Skills:

> This is a list of different attitudes and personal habits that are necessary in the agricultural sector to form personnel who are responsible and who can take care of a farm. Please write an "X" next to what you as an employer consider important. If something is missing, please write it down at the end.

Three groups were identified which influence agricultural education: the technical personnel of government institutions dealing with agricultural education, the agricultural technical personnel belonging to government lending institutions, and the agricultural and animal producers. Input was desired from these three groups to determine their perceptions of the competencies necessary for people to succeed in production agriculture in Honduras as entrepreneurs, mayordomos, and/or farm laborers.

Testing of Items

The questionnaire was pilot-tested in Honduras among the agricultural and animal producers. Producers were considered part of the target population as future employers. The producers who participated in the pilot test were not included in the final representative sample.

The questionnaire was given personally to the selected producers, and was collected after it had been completed. To answer questions pilot test participants might have concerning the questionnaire, a representative of Oregon State University was available in the room during the pilot test. The pilot test was conducted at the beginning of May 1987 at a national meeting of the Honduran Agricultural and Livestock Association. Ten producers pilot-tested the instrument. The producers had no previous notice that they were going to be asked to participate in the pilot test.

Although space was given for suggestions to be written onto the questionnaire, none of the pilot test respondents chose to write any suggestions. The producers expressed orally their suggestions and their concern regarding the problems they had on their farms with alcoholism and the lack of respect the labor force had for them as employers.

Based on the results of the pilot test appropriate changes were made in the list of competencies. Three

additional areas of specialization were added to the questionnaire.

Alcoholism was seen as a major problem of the labor classes in Honduras and it was decided that the final questionnaire should include on Personal Skills. This area was divided into "Work Habits and Attitudes" and "Personal Qualities for Success". Alcoholism was included under Personal Qualities for Success. Ten competencies were included under Work Habits and Attitudes, and seven under Personal Qualities for Success. The information for these categories and the competencies included were taken from the vocational education "Agriculture and Agri-Business Task Inventory" (Fancher, 1987) and the suggestions orally expressed by the producers during the pilot test. Other suggestions made were to include agricultural bookkeeping and some information on farm construction. Therefore, farm construction, agricultural bookkeeping were two additional areas added along with the area of personal skills to the final questionnaire.

The competencies in these three new areas were again reviewed by the same groups of Agricultural Teacher Educators, Vocational Agricultural Teachers, and Latin American animal science and crop science specialists to ensure that the list of competencies was relevant and complete.

Final Administration

The final version of the questionnaire was administered personally in Honduras to each of the three groups (government technical personnel dealing with agricultural education, government technical personnel dealing with agricultural loans, and producers) by the Oregon State University representative. To answer questions the participants might have concerning the questionnaire, the administrator was available in the room. The groups were sampled in a representative manner. Although space was given for suggestions to be written onto the final questionnaire, none of the respondents chose to write any suggestions.

Collection of Data

The instrument was personally delivered to both the pilot test participants and to the final representative samples of the three groups by the Oregon State University representative, and it was collected during May and June, 1987. A copy of the questionnaire is included in Appendix A. Collection of data conforms with a stratified representative sampling technique where the sources of response (government personnel dealing with agricultural education, government personnel of agricultural credit

institutions, and producers) are the strata.

The final representative samples of producers were accessed without previous notice to the participants. Producers from all over Honduras were attending the Agricultural and Livestock Fair in San Pedro Sula, Department of Cortes, at the end of June 1987. One day during the Fair, all producers who were attending were asked to respond to a questionnaire. Because most producers do not live on their farms and do not have fixed office schedules, it is mostly through events of this sort that a representative sample can readily be accessed. The number of respondents by areas of specialization were as follows:

Area	Producers	Area	Producers
Major Species	30	Pomology	11
Minor Species	22	Construction	30
Basic Grains	15	Personal Habits	30
Horticulture	12	Bookkeeping	30

The final representative samples of government technical personnel dealing with agricultural education and of government technical personnel dealing with agricultural loans were also accessed without previous notice to the participants. During a working day, the person who administered the questionnaire went to each of the government institutions and asked the technical personnel

who were present that particular day to respond to the questionnaire. Technical personnel in each of the institutions have flexible hours because they have to travel as part of their duties. Therefore different people are present in the office each working day. The number of respondents by area of specialization were as follows:

Area	Government Sources Dealing With: Education	Loans
Major Species	10	16
Minor Species	10	16
Basic Grains	10	16
Horticulture	10	16
Pomology	10	16
Construction	10	16
Personal Habits	10	16
Bookkeeping	10	16

Statistical Analysis

Data were analyzed by means of Contingency Tables using the Pearson chi-square statistic (Bishop, Fienberg and Holland, 1975) to determine independence between source of response and type of response. For the data, the null hypotheses were that the sources of response (government technical personnel dealing with agricultural education, government technical personnel dealing with agricultural loans, and producers) have the same type of response probability for inclusion of a given skill or competency in agricultural employment or entrepreneurship. The test of

independence was calculated by the following formula:

$$\chi^2 = \sum_i \sum_j (O_{ij} - E_{ij})^2 / E_{ij}$$

Where: Oij = observed number in the ijth cell;
Eij = RiCj/n = expected number in the ijth cell
Ri = ith row total
Cj = jth column total
n = total sample size

The value of chi-square has v = (r - 1)(c - 1) degrees of freedom (r = number of rows, representing the three strata of the population--source of response; c = number of columns, representing the "yes/no" type of answer). If chi-square calculated was greater than or equal to the chi-square from the tables with v degrees of freedom at the 0.05 level of significance, then the hypothesis of independence was rejected. Data were processed for categorical analysis according to the method described by Grizzle, Starmer and Koch (1969) using the SAS Procedures for Personal Computers (SAS Systems, 1985).

A graduated scale rating system was used to identify competencies which were "essential," "important," and "not critical." This guideline was adopted from previous studies using this type of scale response as reported by Evans, Holter, and Stern (1976) and Fancher (1987). Those competencies which were selected by 50 percent or more of the participants were considered "essential". Competencies selected by 30 to 49 percent of the participants were

placed in the "important" category, while competencies selected by fewer than 30 percent respondents were nominally rated as "not critical".

The three categories identified above determined the potential inclusion of the competency in the curriculum. Therefore, since available time is a major constraint for any curriculum, items rated highest were ensured inclusion. Items marked by fewer respondents may not have been included. Input from technical personnel, from producers, from the author's personal agricultural knowledge, from persons interviewed, and from qualitative interpretation of future impact were all considered in determining whether a competency would be included in the final curriculum model. A focus on the needs of small producers, mayordomos and farm laborers were given overriding strength in the synthesis process.

Data were synthesized to develop a curriculum appropriate to the age group, knowledge, and skill level of students of the Common Cycle of General Culture, lower level Middle School, and which would be articulated with upper level curriculum.

Articulation

Upon completion of this newly generated curriculum, existing curricula from the higher level technical education agricultural programs were examined for articulation purposes. It was the intent of this study to provide an agricultural education curriculum for lower level, Common Cycle of General Culture, Middle School programs. In order to provide improved educational experiences and increase the efficiency of overall education at the two levels of agricultural instruction, articulation was necessary to avoid repetition of subject matter and reduce educational costs.

III. RESULTS AND QUALITATIVE DIAGNOSIS

During the in-country visit to Honduras the author reinforced her previous understanding of the agricultural situation by visiting three agricultural schools, six farms, and three government institutions dealing with agriculture. The author observed inappropriate funding of agricultural technical schools by the government institutions manifested in the form of few tools for students to work with, few text and reference books, and not enough qualified agricultural teachers. Technical agricultural programs were too broad for practical application of agricultural information and were aimed at the higher Middle School level. In the whole country, there was only one agricultural program aimed at the lower Middle School level and this tried to cover a vast number of subjects in four years (lower level has only three years). In addition, vocational curricula of the technical agricultural schools tended to emphasize academic and theoretical teaching of agricultural subjects with consequent little opportunity for sufficient work experience. An insufficient number, 58 schools reported by the Anuarios Estadísticos (República de Honduras, 1986), of rural middle or secondary schools throughout Honduras provide education for those wanting it. In addition, schools were not interacting sufficiently with their

communities to make the curricula meaningful. At the same time, business and industry did not cooperate sufficiently with the agricultural technical schools to help with curriculum development and cooperative work experience placement. Nor did they donate tools and equipment.

Visits to farms showed the lack of qualified farm labor, alcoholism problems of laborers, and the unreliability of farm labor. Also, the small peasant subsistence farmers received insufficient and/or inappropriate government financial aid and services.

Armed with information gathered during the in-country visit, the observations made, and the information from the review of literature, the competency questionnaire instrument was developed as described earlier. For potential inclusion of competencies in the curriculum, the following graduated scale rating system as reported by Evans, Holter, and Stern (1976) and Fancher (1987) was used:

50 - 100 percent = Essential
30 - 49 percent = Important
<30 percent = Not critical

Input from technical personnel, from agricultural producers, from the author's personal agricultural knowledge, along with qualitative knowledge of future economic development trends, were all considered in determining whether or not a competency was included in the final curriculum model.

The number of respondents by areas of specialization and source of response are presented in Table 1. The percentages of "Yes" responses by area of specialization and the results of the statistical analyses are presented in Tables 2 through 9. The percentages of "Yes" responses for individual questions by section and response source for the areas of specialization are presented in Appendix B.

For detailed item-by-item curriculum development in individual schools in Honduras, the specific competencies presented in Appendix A should be used with local Advisory Committee input to develop specific agricultural curricula appropriate to the local area. Included here is the general summary for the Republic of Honduras. Included also is a curriculum model to provide a guideline for the process of curriculum development and as an example of the type of product in curricula which might be useful in Honduras.

TABLE 1

NUMBER OF RESPONDENTS BY AREA AND RESPONSE SOURCE

	Government sources dealing with		
Area	Education	Loans	Producers
Major Species	10	16	30
Minor Species	10	16	22
Basic Grains (Crops)	10	16	15
Horticulture	10	16	12
Pomology	10	16	11
Construction	10	16	30
Personal Habits	10	16	30
Bookkeeping	10	16	30

Results of the final sample responses were tabulated by counting the "Yes" and "No" responses to all items in each area of the agricultural competency questionnaire. The Pearson chi-square statistic was used to test the null hypotheses. The null hypotheses stated that the sources of response (government personnel dealing with agricultural education, government personnel of agricultural credit institutions, and agricultural producers) do not differ in response (Yes/No) probability for inclusion of a given competency in an agricultural curriculum. If chi-square calculated was greater than or equal to the chi-square from the tables with 0.05 level of significance, then the hypothesis of independence was rejected.

The questionnaire had eight areas of specialization and was divided into sections within areas of specialization. For discussion purposes the percentages were rounded off to the highest value if the first decimal was 0.5 or greater.

Area I. Beef and Dairy Cattle

This area was divided into the following sections:

A. Breeds
B. Management of Livestock
C. Health and Disease Control
D. Reproduction
E. Parturition
F. Feeds and Feeding
G. Milk Production and Milk Handling
H. Record Keeping
I. Horses

The final representative sample for Area I consisted of 16 government technical personnel dealing with agricultural loans, 10 dealing with agricultural education, and 30 agricultural/cattle producers (they will be referred to as producers). Because the two groups of technical personnel belonged to government institutions, they will be referred to as government sources. The first analysis considered whether the three sources of response were different with respect to type of response. The second analysis considered whether the two government sources were different from each other with respect to type of response. If they were in agreement at the 0.05 level the responses of the two government sources were collapsed, and a third analysis was done. In the third analysis, there was a comparison to see whether the responses of the collapsed government sources were different from those of producers. Government institution responses were collapsed only when in agreement.

If the two government sources were different from each other with respect to type of response then two 2 x 2 chi-square tests were done in which each government source response was compared to the producers' responses.

In the discussion, if government sources were collapsed, they were reported as the collapsed sources. If sources were different, they were reported as such, and each government source response was compared to the producers' responses. Table 2 presents the results of the analyses for Beef and Dairy Cattle according to section.

TABLE 2

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR MAJOR SPECIES

Section	Government sources dealing with: Education	Loans	Producers	Analysis 1,2: 1	2	3
Breeds	96.67	75.00	28.89	*	*	*
Management	92.14	91.07	86.19	NS	NS	*
Health	84.00	91.25	86.44	NS	*	NS
Reproduction	90.00	91.07	70.95	*	NS	*
Parturition	100.00	100.00	82.22	*	NS	*
Feeds	100.00	100.00	90.00	*	NS	*
Milk Production	100.00	100.00	73.89	*	NS	*
Record Keeping	100.00	100.00	95.56	*	NS	*
Horses	67.14	59.82	68.57	NS	NS	NS

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Breeds, had three questions. For the three analyses there was a significant difference ($p<0.05$) between sources of response on the types of response. Approximately

71 percent of the producers said "No" to this section. On the other hand, 97 percent of the technical personnel dealing with agricultural education (those dealing with education), and 75 percent of technical personnel dealing with agricultural loans (those dealing with loans) responded "Yes" to this section. One of the reasons for the discrepancy between the responses given by the producers, and those of the technical personnel may be that the majority of producers in Honduras have "Creole" cattle (type brought in by the Spaniards and not improved). It has been reported that 70 percent of the Honduran cattle are "Creole" while only 30 percent are improved (Secretaria de Cultura y Turismo, 1983).

Most of the crossbred cattle have been improved with Brahman and Zebu. Therefore, whereas the technical personnel have an interest in improving the quality of cattle through careful cross-breeding, the producers felt that knowledge of breeds was not necessary when hiring employees for their farms.

Based on the analyses of this section, if breed identification is to be included in the curriculum, the emphasis should not be placed on having the students learn all about the major beef and dairy breeds, because they are basically nonexistent in Honduras. Cross-breeding and herd improvement are not usually done in Honduras by traditional cattle producers because the imported breeds are not

resistant to heat stress or to tropical diseases and external parasites and it is very expensive to import purebred cattle. However, if future mayordomos are to be made aware of cross-breeding and herd improvement decisions, some knowledge of breeds and their characteristics (particularly the Zebu or Brahman breeds, and the breeds which have been developed from their crosses, such as Santa Gertrudis and Brangus) would be necessary. Therefore, breed information should be presented as hand-out material, shown on slides, or posted in the classroom as color pictures of each breed, but time taken exclusively for breeds should not exceed more than two or three class periods and emphasis should be placed on appropriate breeds.

Section B, Management of Livestock, had 14 questions. For the first and second analysis there were no significant differences ($p>0.05$) between the sources of response and the type of response. This indicates general agreement regarding management techniques for livestock among the two government sources. In the third analysis, when the responses of the two government sources were collapsed and compared with those of the producers they were significantly different ($p<0.05$). Approximately 91 percent of the technical personnel, and 86 percent of the producers said "Yes" to the management section. However, the producers disagreed with the government sources on questions B-9, dehorn, B-11, assist with castrating cattle, and B-13, trim

feet of livestock.

The producers placed less importance on these three management practices because cattle in Honduras are kept on the range, it is not necessary to dehorn, or to trim feet. When cattle are castrated in Honduras, it is to have oxen for farm work. Cattle are not castrated in Honduras for the marbling effect in the meat, as they are in the United States, because local market preference is for lean beef meat. Thus, in Honduras there is no premium paid for marbling, which would be more costly to the producer. However, in the future there may be a need for intensive cattle production as a result of land scarcity and the need for better land management. Then, dehorning and trimming feet would be necessary practices which should not be overlooked. Because castrating is sometimes performed on the farms it should be properly taught to all farm labor. Thus, based on the analyses, and with the future in mind, the whole management section should be emphasized in the curriculum.

Section C, Health and Disease Control, had 15 questions. The first analysis showed no significant difference ($p>0.05$) between the three sources of response. In the second analysis, when the responses of the two government sources were compared to each other, they were significantly different ($p<0.05$). However, in both cases

the percent required for inclusion was well above the cut-off point of 50% (91 percent for those dealing with loans, and 84 percent for those dealing with education).

The third analysis showed no significant difference ($p>0.05$) when the responses of producers were compared to responses of each of the two groups of technical personnel. This analysis shows that technical personnel and producers agree on the importance of livestock health and disease control. Based on the analysis of this section, disease prevention practices should be greatly stressed in the curriculum, particularly the practical aspects, such as controlling main external and internal parasites, vaccinating cattle, and applying general sanitation measures for disease control.

Section D, Reproduction, had seven questions. For the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. In the second analysis, both government sources, when compared, were not significantly different ($p>0.05$). In the third analysis, when the responses of the collapsed government sources were compared to those of the producers, they were significantly different ($p<0.05$). Again, all percentages were well above the break-point required for inclusion. Therefore, this section should receive strong emphasis in the curriculum. The discrepancies in responses between cattle producers and government sources may be that

producers leave most of the reproductive management practices in Honduras to the veterinarians, and not to the hired farm personnel who work with livestock. It may also be that the producers feel artificial insemination (AI), vaginal irrigations, and uterine and vaginal bolus applications should not be performed by untrained personnel, but should be left to the veterinarians.

Not all the upper level agricultural schools in Honduras train students in these techniques. Thus, not all livestock technicians know how to performs these skills, nor do they have much practice if they know about them. Therefore, these competencies should be introduced at the lower Middle School level and skill developed at the upper level schools in an articulated curriculum framework. Focus at the lower level should be on basic understanding of practical information and assistance training. Another reason for training students in these competencies is the fact that in Honduras there are not enough veterinarians, particularly in the rural communities.

Section E, Parturition, had six questions. In the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. There was no second analysis because the responses of the two government sources were in agreement. In the third analysis when the responses of the collapsed government sources were compared to those of the cattle producers, they were

significantly different ($p<0.05$). All technical personnel and 82 percent of the producers said "Yes" to this section. However, both percentages are in the essential category for inclusion in the curriculum.

Parturition is a reproductive function and most producers consider it to be the domain of veterinarians. Presently, with unqualified hired personnel the more complicated and delicate parturition competencies can only be performed by the veterinarians. But future training of farm personnel should include palpation, handling abnormal deliveries, and identifying post-partum complications which includes being aware of knowing when to call the veterinarian.

Section F, Feeds and Feeding, had seven questions. For the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. There was no second analysis because, when the responses of the two government sources were compared, they were in agreement. Technical personnel seem to feel this whole section should be a prerequisite for hiring farm personnel.

In the third analysis when the responses of the collapsed government sources were compared to those of the producers they were significantly different ($p<0.05$). The 100 percent of "Yes" responses given by the collapsed government sources and the producers responses (90 percent) were all in the essential category for inclusion in the

curriculum.

It is essential to include this material in the curriculum because low quality feeds and improper feeding practices cause animals to go off-feed, loose weight, take more time to be ready for market, be more susceptible to diseases, and make producers lose money. Therefore, future small producers and farm laborers should be taught the importance of feeds and proper feeding practices to increase animal production.

Section G, Milk Production and Milk Handling, had six questions. For the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. There was no second analysis because both government sources responded with a 100 percent inclusion. In the third analysis the responses of the collapsed government sources when compared to those of the producers resulted in significant differences ($p<0.05$). All of the government sources and 74 percent of the cattle producers responded "Yes" to the whole section. All percentages were in the essential category for inclusion in the curriculum.

In the future, government lending institutions should be willing to make loans to small farmers to help mechanize their farms where feasible. Consequently, knowledge of different types of milking parlors, milking equipment, and their use should be included in the curriculum. This information should be introductory at the rural level and

greater stress on milking parlors and milking machines should be placed at the upper level technical agricultural schools.

Section H, Record Keeping, had six questions. The first and third analyses showed that there were statistical differences ($p<0.05$) between sources of response. For the second analysis there were no significant differences ($p>0.05$) between the responses selected by the two government sources. In spite of the differences record keeping had very high response rates (both in the essential category) by both technical personnel and producers, and therefore this section should be stressed in the curriculum for lower level agricultural schools. The primary justification for this decision was that it would help the small animal producer and farm laborers because production records would show which animals are doing poorly and what is causing the producer a loss of income.

Traditionally, buying, selling, and all other money matters have been dealt with by owners themselves. This may be due in part to the fact that mayordomos are still unskilled farmers who can be entrusted with farm production but who are not considered capable enough to conduct business transactions for the owner. Trust by the owner in money matters has not been gained by mayordomos because they have not been properly trained in those skills.

In an agricultural curriculum designed to upgrade the

mayordomos and the other farm personnel, all farm record keeping, including buying/selling records should be taught in the lower level middle schools. Eventually, it is hoped that landowners will recognize that the farm personnel trained in rural secondary schools have skills in the area of agricultural record keeping. It would be particularly beneficial to the small animal producers as records would enable them to see their profits or losses.

Section I, Horses, had seven questions. The three analyses showed no significant difference ($p>0.05$) between sources of response on type of response. The percentages were in the essential category in the graduated scale rating to consider the inclusion of a horse section in the curriculum. A great number of small farms in Honduras are not fit to be mechanized due to the unevenness of the terrain, and working horses are good alternatives to farm machinery. Other locations are suitable for mechanization. Hence, the inclusion of this unit should be left to the discretion of the instructor and should be based on local need.

Area II. Minor Species (Swine, Poultry, Rabbits)

This area was divided into the following sections:

A. Selection
B. Reproduction
C. Health
D. Feeds and Feeding
E. Management Practices
F. Housing
G. Record Keeping
H. Marketing

The final representative sample for Area II consisted of 16 government technical personnel dealing with agricultural loans, 10 government technical personnel dealing with agricultural education, and 22 producers. Table 3 presents the results of the analyses for this area by section.

TABLE 3

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR MINOR SPECIES

Section	Government sources dealing with: Education	Loans	Producers	Analysis 1,2: 1	2	3
Selection	100.00	100.00	30.11	*	NS	*
Reproduction	100.00	92.79	32.17	*	*	*
Health	100.00	85.83	70.00	*	*	*
Feeds	100.00	100.00	97.73	NS	NS	NS
Management	88.75	76.95	28.98	*	*	*
Housing	84.29	54.46	30.52	*	*	*
Record Keeping	85.71	75.89	29.22	*	NS	*
Marketing	70.00	54.17	34.85	*	NS	*

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Selection, had eight questions. When compared in the first analysis, the responses of the three groups were significantly different ($p<0.05$). There was no second analysis because the responses of both government sources were in agreement ($p>0.05$). For the third analysis, when the responses of the collapsed government sources were

compared to those of the producers they were significantly different ($p<0.05$).

Since producers rated this section with only 30 percent "Yes" responses, careful consideration must be given to their input. The discrepancy in responses of technical personnel and producers was to questions dealing with identification of breeds for swine (A-1), poultry (A-2), and rabbits (A-3). As with cattle breeds there are hardly any purebred groups of minor species in Honduras. The swine herds most commonly found are of the feral-type, the type of swine brought to America by the Spaniards. It is not a lean animal and it is used for both its meat and its fat. Swine fat is still widely used, particularly in rural Honduras. Presently, some leaner breeds have been imported to upgrade the existing common swine breed but consumers claim the leaner meat is not as tasty as the common type breed. It will take time to develop a market for a leaner swine meat.

Pure breeds of poultry are mainly found on commercial poultry farms in Honduras. The majority of small farmers raise mixed breeds for their own consumption or for egg or meat sales. Rabbits are not commonly raised for meat in Honduras because Honduran people do not consume rabbit meat as they do beef, pork, and chicken, and its demand is negligible. Therefore, it is not important to the majority of producers for their hired labor to be able to identify breeds of swine, poultry, or rabbits.

In a lower level vocational curriculum, a more practical skill for students to possess would be the identification of the meat-producing characteristics of swine, poultry, and rabbits rather than knowledge of breeds. The emphasis on breeds should be left for the higher level technical schools. However, rabbits should not be excluded from a curriculum as they are good backyard meat-producing animals that can serve as protein sources for rural dwellers. Including them in the curriculum might also serve eventually to increase their consumption. Rabbits can also serve as laboratory or demonstration animals where agricultural schools do not have larger animals with which to work.

Section B, Reproduction, had 13 questions. In the three analyses there was a significant difference ($p<0.05$) between sources of response on type of response. Approximately 96 percent of the government sources and 32 percent of the producers responded "Yes."

The lowest response rates were to questions B-2, properly sex chicks (7 percent), B-11, select eggs for hatching quality (7 percent), B-12, operate incubation equipment (3 percent), and B-13, remove chicks from incubator (3 percent). Sexing chicks is hardly ever done by farmers in Honduras as the chicks sold by the government agencies are already sexed when sold to producers. Hatching eggs when sold by the government have already been properly selected. Common practice is to keep a rooster permanently

with the hens and thus all are hatching eggs. Therefore, for producers these practices are not deemed very important when hiring personnel for their farms. In addition, most of the egg collection on traditional farms is done by women, and seldom by men or hired labor.

Not many of the producers have incubators since eggs are hatched by hens, so operating incubation equipment and removing chicks from incubators are not primary concerns. Such practices become major concerns to the big egg-producing units, but these are not widespread throughout Honduras. If farm personnel are going to be upgraded so they can be able to work in big production units, all of these animal raising practices with more efficient techniques have to be considered. Because most rural schools lack sophisticated equipment, at the lower level the awareness of the practices should be considered. If possible, field trips should be taken to commercial poultry plants, and slides and/or pictures of equipment should be shown. Rural schools should consider student work experience at the poultry plants.

Section C, Health, had 15 questions. The three analyses showed statistical differences, but the three response rates are in the essential category for inclusion in the curriculum.

Because of the lack of veterinarians, students should learn to vaccinate, to administer medication by injections, and to treat the most common diseases properly. The importance of quarantine laws should also be stressed so they can understand what it means to human and animal health not to transgress those laws.

Section D, Feeds and Feeding, had four questions. For the first, second, and third analyses the three groups were in agreement for the whole section. The percentages of "Yes" responses to this section were in the essential category for inclusion in the curriculum. Because proper feeds and feeding practices have not been of interest to the majority of producers these essential management techniques should be taught to future producers in order to maximize animal production in Honduras.

Section E, Management Practices, had 16 questions. In the three analyses, the three groups were different. The personnel dealing with loans selected a lower "Yes" response rate than the personnel dealing with education, but the percentages are still significantly higher than those of the producers. For example, it is not a customary practice to clip needle teeth of piglets, or to balance litter numbers of piglets. As previously explained, swine are not raised in large numbers and litters are never big enough to require balancing. Clipping tails of piglets is not customary either, as pigs are either free to roam or so few are kept in an enclosure that tail biting is not a problem.

Thus, all of those competencies were given lower response rates by technical personnel dealing with loans and by the producers.

When it came to questions dealing with rabbits, only the producers who raise rabbits for meat were interested in the rabbit management practices. Even though raising rabbits for meat is not commonly done throughout Honduras, there is a small sector that has already begun raising them. Because rabbits are good backyard meat-producing animals which could provide protein to rural dwellers and a fast cash flow, rabbit production should be promoted and encouraged through rural schools.

In Section F, Housing, had seven questions. The three analyses showed that when compared the responses of the three groups were significantly different ($p<0.05$).

Discrepancies in responses were caused by question F-1, determine housing needs of swine, poultry and rabbits. Approximately 75 percent of the personnel dealing with loans selected "Yes" as compared to 70 percent of those in education and 27 percent of the producers. The differences between sources of response may be because determining animal housing needs has traditionally never been taken into account. Most farm animals are free to roam the farm enclosures, or are kept in small pens without any regard to size of pen according to size of animal.

Construction of fences did elicit 100 percent of "Yes" responses from both government sources and from 67 percent of the producers. Fencing should be in the curriculum with some consideration of appropriate small structures and available local material.

Section G, Record Keeping, had seven questions. For the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. For the second analysis, when the responses of the two government sources were compared to each other, they were not significantly different ($p>0.05$). In the third analysis, the responses of the collapsed government sources when compared to those of the producers were significantly different ($p<0.05$).

Records in general are not usually kept by traditional producers (big or small). Cattle production records have slowly been introduced, but they are still not a very common practice with all cattlemen. Keeping poultry production and feed records probably was seen as not very important to the traditional type of producer. Record keeping, however, is one of the practices that even though it is not seen as important by the actual producers, must be taught to future farmers because of its economic importance in a farm operation. It will especially benefit the small producer if the agricultural schools teach students to organize and keep records and use these to see profits or losses in their agricultural enterprises.

Section H, Marketing, had three questions. In the first analysis there was a significant difference between sources of response on type of response. In the second analysis, when the responses of the two government sources were compared to each other, there were no significant differences ($p>0.05$). In the third analysis, when the responses of the collapsed government sources were compared to those of the producers, they were significantly different ($p<0.05$). The lowest response rates in the whole section were by the producers. They had a 13 percent "Yes" response rate to questions H-2, package rabbit and poultry meat for marketing, and H-3, market eggs. These discrepancies may be due to the fact that marketing of farm products is done directly by farm owners, and farm laborers have no say in these matters. Packaging of rabbits and poultry is not done on farms, but by the intermediaries who buy from the farmers to sell to supermarkets. Otherwise, clients who buy directly from farms buy live and not slaughtered animals, unless clients were to buy meat of animals slaughtered directly on the farm and sold unpacked.

Chicken and rabbit slaughtering and packaging should be addressed in school laboratories so that students learn proper animal handling and slaughtering techniques. Proper slaughtering techniques and direct consumption of small animals on rural farms may be an important way to improve animal handling and protein consumption in a subsistence

situation.

Area III. Basic Grains and Industrial Crops

This area was divided into the following sections

A. Identification
B. Crop Production
C. Diseases, Insects, Pests
D. Harvest
E. Marketing

The final representative sample for Area III consisted of 16 government technical personnel dealing with agricultural loans, 10 government personnel dealing with education, and 15 producers. Table 4 presents the results of the analyses for this area by section.

TABLE 4

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR GRAIN CROP AREA

Section	Government sources dealing with			Analysis 1,2		
	Education	Loans	Producers	1	2	3
Identification	85.00	46.88	36.67	*	*	*
Production	98.75	90.23	72.92	*	*	*
Diseases, Pests	100.00	80.47	58.75	*	*	*
Harvest	100.00	90.63	65.00	*	*	*
Marketing	76.67	75.00	65.00	*	NS	*

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Identification, had four questions. In the three analyses there were significant differences ($p<0.05$) between sources of response on types of response. The lowest percentages of "Yes" responses were caused by questions A-3, identify crops by family, genus and species, and A-4, identify varieties of crops suitable for various sections of Honduras.

Question A-2, identify the morphological characteristics of common crops with proper part names, had higher percentages of "Yes" responses. But for a lower level of agricultural education those questions are too advanced and detailed for students in the Common Cycle of General Culture. These topics should be addressed in the higher levels of education to students in the agricultural technical schools. For lower levels, students need to know only what crops are better suited for their region, how to plant those crops, how to care for them, and how to harvest them.

Section B, Crop Production, had 16 questions. The three analyses were significantly different ($p<0.05$). However, all responses were well within the inclusion break point for curriculum development.

It seemed that for producers it was more important to know the sources of high quality seeds than to know how to select quality seed. Sources of quality seeds in this case were government agencies that sold seeds to producers, not directly from the plant sources. It would be beneficial to small producers to be taught how to recognize plant sources so that they could obtain quality seeds to improve yields since they may be in positions where they are financially unable to purchase seed.

Question B-9, use soil testing to determine pH, was selected by all government sources dealing with education, 63 percent of those dealing with loans, and 53 percent of

the producers. All percentages are high enough for inclusion in the curriculum, however, the relatively low percentage from producers may be because when actual soil testing was done, it was carried out by technical personnel and not by unskilled farm labor. Therefore, for producers this competency was not needed to be able to work on a farm. For the lower level agricultural schools the curriculum should make the students aware of the importance of soil testing. More in depth soil analysis should then be addressed in higher technical schools as it requires knowledge of soil chemistry and other courses not yet taken by lower level students.

Question B-11, understand crop adaptation in terms of soil, climate, and economics, was selected by all personnel dealing with education, by 81 percent of those dealing with loans, and by 53 percent of the producers. All percentages are high enough for inclusion, however, the low percentage from producers may have been due to the fact that crop decisions are made by owners and not by mayordomos or other farm personnel. Owners decide what crops are to be planted, where they will be planted, and how many hectares are to be planted, mostly based on which crops produce a higher income. In upgrading farm personnel it is essential they understand crop adaptation in terms of soil, climate and economics. For small peasant farmers the understanding of crop adaptation may mean better yields and thus more family income in order to have a better quality of life.

Section C, Diseases, Insects, Pests, and Weeds, had 16 questions. In the three analyses, there were statistical differences, but all responses were above the criterion mark for inclusion in the curriculum. An appropriate level material on diseases, insects, pests, and weeds would be critical to the success of small producers, as well as for mayordomos who would learn to take more responsibility for the farm operation.

Most crop producers burn the land once the crops have been harvested thus destroying most weeds, this may account for their low response rate on weed control competencies. Even though this question was selected by a low percentage of the producers, agricultural schools should teach the students alternate methods of dealing with weeds so that soil fertility is not destroyed by constant fire.

Future farmers, should be educated as to the ravages caused to the soil by the slash-and-burn practice of traditional producers. Many producers do not use fertilizers, except for corn and sometimes for beans. When available, fertilizer recommendations are done by government technical personnel or by the private agricultural stores which sell fertilizers and who also have technical personnel who visit farms. But, because there is no quality control as such, these stores may try to sell their products disregarding the crop or soil requirements. It is as a result of crops having been burnt by overfertilization or

loss of crops due to a wrong fertilizer that the majority of producers are sometimes wary of using fertilizers.

Experience has shown that the lack of proper technology (i.e. without the use of fertilizers, herbicides, and pest control programs) on the mountain slopes, not only causes soil erosion but also the loss of a sizable percentage of crops to diseases and pests. To counteract the constant burning of land it would be good practice to introduce the use, the type, and the time of application of fertilizers in a curriculum. However, in Honduras buying chemical fertilizers is not cheap. It would be better for economic reasons to substitute fertilizer ingredients, but this substitution should be done by crop scientists and not by lower level agricultural personnel because it entails an in-depth knowledge of different subjects such as soil chemistry, agronomy, and economics.

Question C-12, treat grain properly and safely for pest control. For the lower level agricultural student it would be sufficient to be taught to use the treated grain rather than to actually treat grain. Grain treatment should be addressed in the technical agricultural schools.

Question C-15, describe the life cycles of insects and diseases. These descriptions should be included in a higher level agricultural curriculum, but not in a lower level which should be more practical than technical. In the lower level the students should only learn which insects are

harmful, that there are stages of development and therefore treatment must be applied more than once, at which stage they do their major damage, and how to combat them.

Section C, Diseases, Insects, Pests, and Weeds has been quite contradictory in the percentages of "Yes" responses given by the three groups. For the curriculum the merits of each competency have to be considered individually and an effort to articulate the lower and higher level instruction in Honduras would be critical.

Section D, Harvest, had four questions. The three analyses were significantly different ($p<0.05$). The breakpoint for inclusion in the curriculum was lower than all responses, and therefore, this material should be included in the lower level curriculum.

Question D-3, classify grain, elicited the lowest selection of "Yes" responses from both the producers (33 percent) and the government sources dealing with loans (63 percent). All personnel dealing with education selected "Yes" the competency was needed. It is understandable that grain classification is not critical to the producers because it is not done by them. When done, it is done by government technical personnel. At the lower level this competency should not be required but students should be taught the importance of grain classification, and how classified grain should be used in selecting seed.

Section E, Marketing, had three questions. In the first analysis the sources of response were significantly different ($p<0.05$). For the second analysis when the responses of the two government sources were compared they were not significantly different ($p>0.05$). In the third analysis the responses for the collapsed government sources were significantly different ($p<0.05$) from those of the producers. Approximately 76 percent of the government sources and 44 percent of the producers responded with "Yes" to this section.

Sources of discrepancy were found in responses selected by government sources and by producers to questions E-1, know local market, and E-2, know marketing seasons of best prices. Particularly for the small producers, it would be advantageous to know their local markets, not only their geographical sites but knowledge of their clientele and their preferences. Most importantly small producers need to know when and how to supply their local market to create and meet more demand for their products. These marketing issues should be addressed in an agricultural curriculum for the benefit of the small producer in particular.

Area IV. Horticulture

This area was divided into the following sections

A. Identification
B. Crop Production
C. Disease, Insect, and Weed Control
D. Agri-Chemicals
E. Harvest
F. Marketing

The final representative sample for Area IV consisted of 16 government technical personnel dealing with loans, 10 government personnel dealing with education, and 12 producers. Table 5 presents the results of the analyses for this area by section.

TABLE 5

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR HORTICULTURE

	Government sources dealing with			Analysis 1,2		
Section	Education	Loans	Producers	1	2	3
Identification	100.00	70.00	60.00	*	*	*
Production	95.00	89.84	81.25	*	NS	*
Diseases, Pests	100.00	71.88	91.67	*	*	*
Agri-Chemicals	100.00	93.75	83.33	*	NS	*
Harvesting	100.00	100.00	95.83	NS	NS	*
Marketing	90.00	62.50	33.33	*	*	*

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Identification, had five questions. In the three analyses statistical differences existed among the three groups. However, all respondents placed this section in the inclusion category for the middle school curriculum. Some sources of discrepancy were found in responses selected by government sources and producers to questions A-3, describe advantages/disadvantages of monoculture, and A-4, describe advantages/disadvantages of diversification.

Because both competencies deal with descriptions of advantages/disadvantages they are bound to be selected by a lower percentage of producers who make those decisions themselves.

It is interesting to note that 50 percent of producers thought it would be good to have farm personnel conscious of the importance of vegetable products in human nutrition (A-5), while 63 percent of the personnel dealing with loans, and all personnel dealing with education responded "Yes" to this question. These were a high enough percentage coming from all groups to address the topic of human nutrition and its relation to vegetable products in an agricultural curriculum. Rural dwellers suffer from chronic malnutrition in Honduras. Helms (1984) stated that in the late 1970s in eighty percent of the total Honduran population malnutrition was prevalent. Among the causes of malnutrition were inadequate food production, low purchasing power, and lack of education.

Section B, Production, had eight questions. In the first and third analyses there were significant differences ($p<0.05$) between sources of response on type of response. For the second analysis, when the responses of the two government sources were compared, they were found to be the same ($p>0.05$). Even though there were statistical differences, all groups rated this area high enough for inclusion in the curriculum.

Soil analysis, is essential but should be done by higher level technical personnel. Lower level students should be taught the practical aspects of soil analysis and not the in-depth theoretical aspects of it.

In this section it is very interesting to note that a very high percentage (83) of "Yes" responses was selected by producers when they answered question B-5, select appropriate site for planting vegetables, which truly indicates their interest in having farm personnel knowledgeable of this competency. Thus, this competency should be considered essential in the curriculum.

Section C, Disease, Insect, and Weed Control, had eight questions. In the three analyses statistical differences existed, but all groups rated this section with percentages in the essential category for inclusion in the curriculum. Although at the lower level this competency should not include the in-depth theoretical aspects but rather deal with the more practical aspects of how to combat diseases, pests, and weeds.

This section has been unusual in that the producers have selected a higher percentage of "Yes" responses than one of the government sources. It may be because technical personnel dealing with loans are the ones who give assistance to the producers in dealing with weed control, diseases, and nutrient deficiencies. If farm personnel are to be upgraded so they acquire better agricultural

production techniques, the whole section should be addressed in the curriculum.

Section D, Agri-chemicals, had four questions. In the first and third analyses there were statistical differences. The responses of the two government sources were the same statistically. Nevertheless, the percentages were in the essential category for inclusion in the curriculum. Safety precautions and handling of agric-chemicals should be the topics addressed in the lower level curriculum.

Section E, Harvest, had four questions. In the first analysis there were no significant differences ($p>0.05$) between sources of response. There was no second analysis because the responses of both government sources were not significantly different ($p>0.05$). For the third analysis, when the responses of the collapsed government sources were compared to the producers, they were significantly different ($p<0.05$). The percentages were in the essential category for inclusion in the curriculum.

Section F, Marketing, had four questions. The three analyses were significantly different ($p<0.05$). Approximately 73 percent of the government sources and 33 percent of the producers selected "Yes".

There were four questions in this section, and the lowest response rates were by the producers while the highest were by those dealing with education. On the whole, competencies dealing with marketing would elicit a lower

percentage of "Yes" responses by producers because as owners they deal with marketing personally, this being a financial matter ultimately. Question F-4, selling the vegetables, is an example of the aforementioned matter and it had the lowest "Yes" response rate (16 percent) by the producers. In comparison all of those dealing with education and 63 percent of those dealing with loans selected this same question. Particularly to benefit the small producers, the agricultural curriculum should include a marketing section as they should be taught better marketing techniques to increase their income sources.

Area V. Pomology (fruit tree growing)

This area was divided into the following sections

A. Selection
B. Planting
C. Irrigation
D. Disease, Pest, and Insect Control
E. Pollination
F. Harvest
G. Marketing

The final representative sample for Area V consisted of 16 government technical personnel dealing with loans, 10 government technical personnel dealing with education, and 11 producers. Table 6 presents the results of the analyses for this area by section.

TABLE 6

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR POMOLOGY

Section	Government sources dealing with: Education	Loans	Producers	Analysis 1,2: 1	2	3
Selection	100.00	100.00	75.00	*	NS	*
Planting	100.00	98.44	85.23	*	NS	*
Irrigation	100.00	100.00	100.00	NS	NS	NS
Diseases, Pests	94.44	81.25	88.89	*	*	NS
Pollination	70.00	47.92	48.48	NS	NS	NS
Harvesting	80.00	77.08	75.76	NS	NS	NS
Marketing	88.33	89.58	50.00	*	NS	*

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Selection, had four questions. For the first and third analyses the three sources of response were significantly different ($p<0.05$). There was no second analysis because when the responses of the two government sources were compared they were the statistically the same ($p>0.05$). Even though statistical differences existed, the percentages of "Yes" responses are in the essential category

for inclusion in the curriculum.

The four questions in this section dealt with selection of varieties of fruit trees, of planting sites, and of selection of sites with adequate water drainage. Therefore, the producers had a lower response rate while technical personnel as a whole selected all questions. Generally all selections are done by owners of farms and not by mayordomos or other farm personnel. Sometimes owners are aided in these selections by government technical personnel, and this could be another reason for having lower response rates for these competencies as owners do not perceive their actual farm personnel as competent in any type of selection.

Section B, Planting, had eight questions. In the first analysis there was a significant difference ($p<0.05$) between sources of response on type of response. There was no second analysis as the responses of the government sources were not significantly different ($p>0.05$). In the third analysis, when the responses of the collapsed government sources were compared to the producers, they were significantly different ($p<0.05$). As a single group, both government sources and 75 percent of the producers selected the whole section. Five of the eight questions were selected by all of the producers.

Question B-4, dealing with the use of soil analysis for pH determination, was selected by the producers with the lowest response rate (36 percent). As discussed previously, soil analysis is usually only done by government technical

personnel and is not a very common practice among traditional producers. Question B-1, determine soil structure, texture, and permeability, was selected with the next lowest response rate (55 percent) by the producers, by 94 percent of government sources dealing with loans and by all government sources dealing with education. All response sources agree this competency should be included in the curriculum and it should be given at the lower agricultural level. Some of the competencies in this section are essential in a lower level agricultural curriculum, while others should be left for a higher level of training.

Section C, Irrigation, had two questions. This whole section had no analyses as the three sources of response were the same when the first analysis was done. The three groups had 100 percent "Yes" response rate for both questions. The three sources of response were in complete agreement. Irrigation should be an essential component of the curriculum as without water and proper irrigation techniques, fruit production can not exist.

Section D, Disease, Pest, and Insect Control, had nine questions. The first and second analyses showed differences in response rates. The third analysis showed no significant differences between the responses of each of the government sources and the producers' responses. But, all respondent groups placed this section in the essential category for inclusion. This is a very unusual section in that producers had higher percentages than both government sources for some

of the questions. It may be that this group of producers is more progressive than the groups which own livestock. Fruit tree growing plantations as such are a more recent development than livestock or basic grain production. This may have had an influence in that fruit tree producers were more apt to accept more types of technological changes than the more traditional producers. Also, many actual plantation owners are professionals in the agricultural sciences, which is why they more readily accept innovative techniques.

Section E, Pollination, had three questions. For the first, second, and third analysis there were no significant differences ($p>0.05$) between sources of response on type of response. Of the three questions only E-3, thin fruit by hand, was selected by the three sources of respondents. E-1, assure adequate pollination by use of bees where appropriate, had the lowest percentage "Yes" response rate. Approximately 50 percent of those dealing with education, 19 percent of those dealing with loans, and 18 percent of the producers responded "Yes" to this question. Not many fruit tree growers have bees for pollination purposes.

Bee-keeping is not widespread throughout Honduras, although it is done by some small farmers as a second source of income. Even though the majority of percentages fall in the not critical category, bee-keeping should be encouraged at lower level agricultural schools. Bee-keeping as well as

rabbit raising, are both fast income and food sources requiring minimum space for production purposes, and would be particularly helpful for subsistence farmers.

Section F, Harvest, had three questions. When compared, the three sources of response were in complete agreement in the three analyses. Overall the percentages of "Yes" responses for the section as a whole were, 80 percent by those dealing with education, 77 percent by those dealing with loans, and 76 percent by producers. All percentages fall in the essential category for inclusion in the lower level curriculum.

Because harvesting is mostly done by hand appropriate methods of harvesting fruit should be taught in schools so that trees and fruits are not damaged by hand-pickers who have not been properly trained in this competency.

Section G, Marketing, had six questions. The first and third analyses were significantly different ($p<0.05$). There was no second analysis because the responses of both government sources were not significantly different ($p>0.05$). Approximately 50 percent of the producers and 89 percent of the government sources had selected "Yes" responses. While there were statistical differences all responses were in the essential category.

Question G-4, sorting fruit after harvested, was selected by all producers and by all government sources. This may be because most of the fruit produced is for export

and sorting is actually done on those plantations. Questions dealing with the determination of a method of selling fruit (G-1), and actually selling the fruit (G-6), were selected with the lowest percentages of "Yes" responses by producers (18 percent). This subject has been discussed previously whenever the prerogative of owners in buying and selling was concerned.

Even though knowledge of local markets was selected by a low percentage of producers, both competencies should be included in the curriculum as marketing skills are essential in any agricultural enterprise and would benefit the smaller producer in particular. Competencies such as all marketing skills which have the potential of increasing the producer's income should be taught in lower level middle agricultural schools.

Area VI. Farm Construction

This area consisted of one section, Construction and Repair, and had 13 questions. The final representative sample consisted of 10 government sources dealing with education, 16 government sources dealing with loans, and 30 producers. Table 7, presents the results of the analyses for this area.

TABLE 7

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR FARM CONSTRUCTION

Section	Government sources dealing with			Analysis 1,2		
	Education	Loans	Producers	1	2	3
Construction & Repair	87.86	85.27	65.95	*	NS	*

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

For the first analysis there was a significant difference ($p<0.05$) between the three sources of response on type of response. For the second analysis the responses of the two government sources were not significantly different ($p>0.05$). In the third analysis the responses of the collapsed government sources when compared to those of the producers were found to be significantly different ($p<0.05$). All respondents rate the competencies in this area in the essential category.

The lowest responses dealt with design and construction of basic animal housing. Traditional small animal producers do not have special facilities constructed according to size

of herd or size of animal as is the custom in the United States where the Extension Service develops plans according to region. In Honduras there are no standard plans, and producers have either local masons build pens for animals, or they build rustic enclosures to keep animals.

The majority of small animal producers in Honduras are in that business with no sense of permanency as is found with producers in the United States. For the small animal producer it is a temporary income source dependent on an unreliable feed source and an unstable market. Therefore, their buildings are not always permanent. For future use it would be convenient to have agricultural students learn to plan and build basic animal housing according to size of herds. To avoid health hazards due to overcrowding and for more efficient animal production planning, building of basic animal housing should be stressed in an agricultural curriculum.

Area VII. Agricultural Bookkeeping

This area had one section with four questions. The final representative sample consisted of 10 government sources dealing with education, 16 government sources dealing with loans, and 30 producers. Table 8, presents the results of the different analyses for this area by section.

TABLE 8

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR AGRICULTURAL BOOKKEEPING

	Government sources dealing with			Analysis 1,2		
Section	Education	Loans	Producers	1	2	3
Bookkeeping	68.00	70.00	60.00	NS	NS	NS

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

In this section all analyses showed agreement between the three groups of respondents, and all were in the essential category. Basic bookkeeping operations are essential in all agricultural enterprises. By showing the producers the success or failure of their enterprise proper bookkeeping can help with future projection decisions. Basic financial bookkeeping should be included in the lower level middle school curriculum.

Area VIII. Personal Behavior and Attitudes

This area was divided into the following sections:

A. Work Habits and Personal Attitudes
B. Personal Qualities for Success

The final representative sample consisted of ten government sources dealing with education, sixteen government sources dealing with loans, and thirty producers. Both government sources and 94 percent of the producers selected this area as a whole. The percentages are in the essential category for inclusion in the curriculum. Table 9, presents the results of the analyses for this area by section.

TABLE 9

PERCENTAGE OF "YES" RESPONSES BY RESPONSE SOURCE FOR PERSONAL BEHAVIOR AND ATTITUDES

	Government sources dealing with			Analysis 1,2		
Sections	Education	Loans	Producers	1	2	3
Habits & Attitudes	100.00	100.00	93.67	*	NS	*
Qualities for Success	100.00	100.00	98.10	NS	NS	NS

1 Analysis 1: All three sources are considered separately.
Analysis 2: The two government sources are compared.
Analysis 3: If the government sources were the same, their responses were collapsed and compared to the producers' responses. If the responses of the two government sources were different, each government source response was compared to producers' responses.

2 * = Significant ($p<0.05$)
NS = Non-significant ($p>0.05$)

Section A, Work Habits and Personal Attitudes, had 10 questions. For the first analysis there was a significant difference ($p<0.05$) between the sources of response on type of response. There was no second analysis because the responses of the two government sources were not significantly different ($p>0.05$). In the third analysis the responses of the collapsed government sources were significantly different from those of the producers ($p<0.05$). All competencies however, were rated in the essential category.

Section B, Personal Qualities for Success, had seven questions, and overall it was selected by a higher percentage of "Yes" responses by the producers than Section A. The two government sources had a 100 percent "Yes" response rate and the producers 98 percent. There were no differences by respondents to items in Section B. It is essential that personal habits and attitudes be included in an agricultural curriculum particularly to inculcate a sense of pride in the work done, responsibility in doing the best job, and respect toward employers, peers, and self.

This area of Personal Behavior and Attitudes as a whole obtained very high percentages of "Yes" responses from the final representative sample of producers. In fact, it was included at the suggestion of the producers who had participated in the pilot test. When those producers responded to the pilot test they particularly indicated that

both reliability and alcohol use should be included in the final questionnaire. One of the worse problems in rural Honduras is alcoholism. It is almost a tradition that most men are heavy drinkers and, as a result, farm owners have to cope with an unreliable labor force. These competencies should be part of the curriculum and be integrated into the course "Morale and Civics" that Middle School students take.

IV. A CURRICULUM MODEL

Data were synthesized to develop an agricultural curriculum in Honduras appropriate to age group, knowledge, and skill level for the Common Cycle of General Culture, lower level Middle School.

The curriculum model was developed from the survey results and the qualitative data identified in Chapter 3. Minimum competencies were identified for the purpose of upgrading the agricultural skills of rural students in the Common Cycle of General Culture. Among the strategies used for curriculum construction was the Twelve-Step Curriculum Development Procedure (Cole, 1982) identified in Chapter 2.

The agricultural subjects will be incorporated into the existing Common Cycle curriculum. At present the Common Cycle of General Culture consists of three years, each year with two semesters of 20 weeks each. In Honduras, the school year starts in mid-February and ends in November. Classes are conducted five days a week for eight hours daily.

Since time for school study was a major constraint, those items rated highest in the competency survey were assured of inclusion in the curriculum.

Input from technical personnel, from producers, and from the author's personal agricultural knowledge and experience were considered in determining whether a

competency would be included in the final curriculum model. Future impact and economic efficiency were also considered in determining the inclusion of a competency in the model.

This curriculum was designed for the sole purpose of upgrading the agricultural techniques of rural students who continue into the Common Cycle of General Culture. It is hoped that these students will return with better skills to work in their own farms, or will be employed in farms as mayordomos and/or farm laborers. The curriculum will also permit the student to continue studying in the Diversified Cycle of the Honduran Middle Schools.

The curriculum was meant to be vocational; that is, it prepares people for work and it recognizes experience as the fundamental medium through which the student learns. Thus, the emphasis was on the practical aspects and not on the theoretical components.

The specification of subject matter into the different school years was done in the form of guidelines to the instructor. The intent was that the type of subject matter and/or how heavily it would be stressed would change according to local needs in the various agricultural regions in Honduras.

The time per week per agricultural subject matter was expressed as a percentage of time, instead of in hours per week. This allows the instructor flexibility when making a decision as to the maximum load of a specific area according

to regional needs. The agricultural subject matter is intended to be integrated into the general curriculum of the school.

The three-year agricultural program can be structured as follows:

Agricultural Common Cycle Of General Culture

First Year	Second Year	Third Year
	First Semester	
Horticulture	Basic Grains	Beef Cattle
Personal Behavior	Construction	Horses
Bookkeeping	Poultry	
	Second Semester	
Pomology	Industrial Crops	Dairy Cattle
Rabbits	Swine	

First Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
HORTICULTURE:		
Identification	10	* Classrm 4%;* Lab 6%
Production	30	Classrm 10%; Lab 20%
Weed, Pest, Insect & Disease Control	20	Classrm 5%; Lab 15%
Agri-chemicals (Handling & Safety)	15	Classrm 5%; Lab 10%
Harvest	20	Classrm 5%; Lab 15%
Marketing	5	Classrm 2%; Lab 3%
PERSONAL BEHAVIOR:		
Work Habits & Attitudes	50	Classroom
Personal Qualities for Success	50	Classroom
BOOKKEEPING:		
Balance Sheets	40	Classroom
Income Statements	40	Classroom
Closing Accounts	20	Classroom

* Classroom
* Laboratory/Field work

First Year Second Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
POMOLOGY:		
Selection	10	Classrm 2%; Lab 3%
Planting	25	Classrm 10%; Lab 15%
Irrigation	20	Classrm 10%; Lab 10%
Disease, Pest, Insect Control	15	Classrm 5%; Lab 10%
Pollination	7	Classrm 3%; Lab 4%
Harvesting	15	Classrm 5%; Lab 10%
Marketing	8	Classrm 4%; Lab 4%
RABBITS:		
Selection	5	Classrm 2%; Lab 3%
Reproduction	10	Classrm 5%; Lab 5%
Health	20	Classrm 5%; Lab 15%
Feeds & Feeding	15	Classrm 5%; Lab 10%
Management Practices	25	Classrm 5%; Lab 20%
Housing	10	Classrm 5%; Lab 5%
Records	10	Classrm 5%; Lab 5%
Marketing	5	Classrm/field trips

Second Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
BASIC GRAINS:		
Identification	5	Classrm 2%; Lab 3%
Crop Production	25	Classrm 10%; Lab 15%
Diseases, Insects, Pests & Weeds	20	Classrm 5%; Lab 15%
Harvest	15	Classrm 5%; Lab 10%
Marketing	5	Classrm/Field Trips
FARM CONSTRUCTION:		
Construction	50	Classrm 25%; Lab 25%
Repair	50	Laboratory
POULTRY:		
Selection	5	Classrm 2%; Lab 3%
Reproduction	10	Classrm 5%; Lab 5%
Health	20	Classrm 5%; Lab 15%
Feeds & Feeding	15	Classrm 5%; Lab 10%
Management Practices	25	Classrm 5%; Lab 20%
Housing	10	Classrm 5%; Lab 5%
Records	10	Classrm 5%; Lab 5%
Marketing	5	Classrm/Field Trips

Second Year Second Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
INDUSTRIAL CROPS:		
Identification	5	Classrm 2%; Lab 3%
Crop Production	25	Classrm 10%; Lab 15%
Diseases, Insects, Pests & Weeds	20	Classrm 5%; Lab 15%
Harvest	15	Classrm 5%; Lab 10%
Marketing	5	Classrm/Field Trips
SWINE:		
Selection	5	Classrm 2%; Lab 3%
Reproduction	10	Classrm 5%; Lab 5%
Health	20	Classrm 5%; Lab 15%
Feeds & Feeding	15	Classrm 5%; Lab 10%
Management Practices	25	Classrm 5%; Lab 20%
Housing	10	Classrm 5%; Lab 5%
Records	10	Classrm 5%; Lab 5%
Marketing	5	Classrm/Field Trips

Third Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
BEEF CATTLE:		
Breeds	5	Classroom
Management	25	Classrm 10%; Lab 15%
Health & Disease Control	20	Classrm 5%; Lab 15%
Reproduction	15	Classrm 5%; Lab 10%
Parturition	10	Classrm 3%; Lab 7%
Feeds & Feeding	10	Classrm 5%; Lab 5%
Milk Production & Milk Handling	5	Classrm 2%; Lab 3%
Records	10	Classrm 5%; Lab 5%
HORSES:		
Care for Horses & Tack	10	Laboratory
Riding	20	Laboratory
Cattle rounding	25	Laboratory
Nutrition	15	Classrm 10%; Lab 5%
Sanitation	10	Classrm 5%; Lab 5%
Horse-shoeing	20	Laboratory

Third Year Second Semester

SUBJECT MATTER	TIME ALLOCATED (%)	INSTRUCTIONAL SETTING
DAIRY CATTLE:		
Breeds	3	Classroom
Management	25	Classrm 10%; Lab 15%
Health & Disease Control	20	Classrm 5%; Lab 15%
Reproduction	15	Classrm 5%; Lab 10%
Parturition	10	Classrm 3%; Lab 7%
Feeds & Feeding	10	Classrm 5%; Lab 5%
Milk Production & Milk Handling	7	Classrm 3%; Lab 4%
Records	10	Classrm 5%; Lab 5%

For specific competencies in each subject matter area see Appendix A. Appendix B identifies competencies that were statistically significant.

References or resources to be used by the agricultural teachers should be ones that are readily available and appropriate for Honduras. Textbooks and workbooks used in the Escuela Agricola Panamericana in El Zamorano, Honduras, or ones used in the agricultural school in Turrialba, Costa Rica, are highly recommended

higher technical levels; therefore, it is the job of the agricultural teacher to convert these materials to an instructional level that is appropriate for the age and readiness of the students in the Common Cycle of General Culture. For these students at the lower level, agricultural teachers should take special notice of the more practical aspects of the units in the textbooks and workbooks.

Articulation

Existing curricula from the higher level technical education agricultural program were examined for articulation purposes. In order to provide improved educational experiences and to increase efficiency at the two levels of agricultural instruction, articulation is necessary to avoid repetition of subject matter and to reduce educational costs.

The following competencies were identified by this study as essential or important, but were judged to be too technical and/or required prerequisites too high for the Common Cycle of General Culture (lower level Middle School). These should, therefore, be incorporated into the Diversified Cycle (higher level Middle School):

1. Advantages and disadvantages of major European cattle breeds (Bos taurus), as well as major swine, poultry, and rabbit breeds.
2. Reproductive animal management practices such as the performance of artificial insemination, handling of abnormal deliveries, and the genetic selection of meat, milk, or egg production characteristics.
3. Performance of vaginal irrigations, and uterine and vaginal bolus applications in cattle (this competency should be taught both in the upper and lower Middle School levels).
4. Description of the estrus or reproductive cycles of cattle and minor species.
5. Castrating techniques, should be taught in both upper and lower school levels.
6. Knowledge and usage of milking and poultry equipment.
7. Knowledge of milking parlors.
8. Knowledge and descriptions of different types of feeding systems.
9. Identification of the morphological characteristics of common crops with proper part names, and of family, genus, and species.
10. Soil testing to determine pH and soil analysis.

11. Substitution of fertilizer ingredients according to economic and agronomic conditions.
12. Description of the life cycles of insects and plant diseases.
13. Grain classification and grain treatment.
14. Disease, insect, and weed control in-depth theoretical aspects.

At the Common Cycle of General Culture these competencies should be given at an introductory level, to create an awareness of the competencies or to teach students practical applications of the competencies. This lower level should teach students the "how to do," "how to handle," and "what to do about a problem," but not the in-depth reasons behind the doing.

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purposes of this study were to identify skills needed in production agriculture for rural youth in Honduras, and to develop an appropriate agricultural education curriculum model at the Common Cycle of General Culture (lower Middle School level) of the current educational system. Data were collected from 56 individuals representing three groups that influence agricultural education in Honduras: technical personnel of government institutions dealing with agricultural education, technical personnel of government institutions dealing with agricultural loans, and agricultural and animal producers. A representative sample of each group was taken. Data were analyzed by means of Contingency Tables using the Pearson chi-square statistic (Bishop, Fienberg and Holland, 1975) to determine independence between sources of response and type of response. Qualitative data and future needs of employees as determined by production and marketing trends were used to provide balance and perspective to the quantitative data. The conclusions are presented according to specific objective.

Objective One

The first objective was to complete a competency analysis to identify competencies required of rural youth to improve agricultural production, as perceived by animal and agricultural producers, government technical personnel dealing with agricultural education, and government technical personnel dealing with agricultural loans (groups that influence agricultural education in Honduras).

Through the results of a competency-based questionnaire, core competencies required of rural youth were identified. Competencies identified were those that would improve agricultural production for subsistence farms, farm laborers, and mayordomos as perceived by those three groups.

For the majority of competencies a high degree of consensus existed among technical personnel belonging to the two government institutions regarding the agricultural skills needed by rural youth. When perceptible differences occurred among the three groups, government technical personnel tended to respond alike. Producers and government technical personnel dealing with agricultural education tended to respond differently more often than any other group.

Marked differences occurred between the above mentioned two groups regarding competencies dealing with areas of an owner's decision-making prerogative such as descriptions,

identifications, financial and marketing decisions, and competencies considered by producers as being in the domain of veterinarians, such as reproduction, parturition, and common disease treatment. Producers' responses tended to support competencies perceived as more practical and "hands-on" as opposed to those which were within the decision-making prerogative of owners.

Conclusions for Objective One

The following competencies were identified as required of rural youth to improve agricultural production and as ones that should be incorporated into the Common Cycle of General Culture:

1. Some knowledge and characteristics of cattle breeds, particularly Brahman/Zebu and their crosses as these are most prevalent in Honduras. Awareness of the European cattle breeds, of major swine, poultry, and rabbit breeds.
2. Identification of the meat-producing characteristics of swine, poultry, and rabbits.
3. Dehorning and castrating cattle.
4. Control of main external and internal parasites in cattle, swine, poultry, and rabbits.
5. Making and following vaccination calendars for disease prevention in animals and actual vaccination of animals.

6. Assisting with cattle artificial insemination.
7. Performance of vaginal irrigations, and uterine and vaginal bolus applications in cattle (this competency should be taught at both the upper and lower Middle School levels).
8. Palpating pregnant cows and does.
9. Handling of normal deliveries in cows and sows, recognition of signs and assisting with abnormal deliveries, and identification of post-partum complications.
10. Identification of available common feedstuffs and selection of quality feed.
11. Pasture management and awareness of importance of soil testing for pH determination.
12. Basic knowledge of soil structure, texture, and permeability.
13. Selection/use of high quality seeds in farm crops.
14. Introduction to milking equipment, to milking parlors, and to poultry equipment.
15. Proper milking and milk handling.
16. Crop adaptation in terms of soil, climate, and economics.
17. Farm record keeping (production, feeding, and breeding records).
18. Basic bookkeeping of animal movement (buying/selling), crop production records, and other basic financial farm bookkeeping.

19. Knowledge of local markets and marketing farm products.
20. Recognition of harmful pests and insects, treatment at their different stages of development, stages of major damage, and how to combat them. Weed and weed seed identification and control methods.
21. Recognition of nutrient and water deficiency symptoms in plants and crops.
22. Importance of grain classification and how classified grain should be used in selecting seed.
23. Agri-chemical safety precautions and handling.
24. Planning and building basic animal housing facilities and equipment, repairs, and fence building.
25. Proper slaughtering of poultry and rabbits.
26. Personal behavior and attitude skills.
27. Observance and importance of quarantine laws.

Objective Two

The second objective was to develop curriculum appropriate to identified competency requirements. This curriculum considered the producers' actual immediate needs as to competency requirements. It also considered future needs to upgrade the agricultural skills and education of

farm personnel, specifically, those of subsistence farmers, mayordomos, and farm laborers, by collecting government agency information and utilizing qualitative data.

Conclusions for Objective Two

The curriculum developed for the lower level, Common Cycle educational system considered the basic agricultural skills and integrated different subject matter into single courses. For example, horticulture, pomology, basic grains, and industrial crops all required basic knowledge and practical skill in soils, entomology, phytopathology, and agri-chemical handling. These subjects were integrated and not offered as separate courses as is done in the upper level agricultural curricula of Honduras. Examples of the integration of subjects follow.

Examples of Subject Integration:

Horticulture:

Identification

- Vegetables requiring direct and indirect planting
- Monoculture and diversification
- Vegetables as food and in diets

Production

- Proper techniques for vegetable seedling planting
- Proper techniques for transplanting seedlings
- Soil structure, texture, and permeability
- Planting sites for a variety of vegetables
- Irrigation
- Planting season for individual vegetables
- Proper cultural techniques for individual vegetables

Weed, Pest, Insect, and Disease Control

- Identification of main diseases of the area
- Recognition of nutrient and water deficiency symptoms
- Identification of main harmful insects
- Identification of weeds and their seeds
- Rodent and insect control
- Different methods of weed control (crop rotation, cultivation, physical methods and approved herbicides)

Agri-chemicals

- Appropriate methods for insecticide applications
- Appropriate methods for bactericide, fungicide, and herbicide applications
- Safety precautions when handling agri-chemicals
- Contamination symptoms, residuals and antidotes

Harvesting

- Harvesting at proper stage and time
- Sorting vegetables properly

Marketing and Agricultural Bookkeeping

- Knowledge of local markets, packaging vegetables
- Marketing vegetables; balance sheets

Pomology:

Selection

Selection of appropriate varieties of fruit trees
Selection of appropriate site with adequate water
Adequate water drainage
Selection of site according to variety of tree

Planting

Determining soil structure, texture and permeability
Preparation of planting site
Addition of organic matter where needed
Using soil analysis for pH determination
Applying fertilizers using appropriate technique
Applying lime if needed
Selection of appropriate grafting material
Applying different grafting techniques

Irrigation

Soil preparation to receive irrigation water
Applying irrigation water according to variety

Disease, Pest and Insect Control

Identification of main diseases and insects of each fruit tree variety
Following directions in the use of insecticides and fungicides
Protecting wounds on trees
Making and following a disease and insect program
Choosing disease resistant varieties where available
Use of traps to anticipate a rise in insect population
Recognizing nutrient and/or water deficiency in trees and fruits
Control of rodents and birds in orchards

Pollination

Assuring adequate pollination by use of varieties
Assuring pollination by use of bees
Thinning fruit by hand

The following is a curriculum outline of the agricultural Common Cycle of General Culture:

First Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER:

HORTICULTURE

Identification of vegetables and nutritional information.

Vegetable production techniques.

Weed, pest, insect, and disease control problems in vegetable production.

Agri-chemicals handling and safety usage in vegetable production.

Harvesting and storing vegetables.

Marketing vegetables.

PERSONAL BEHAVIOR AND ATTITUDES

Work habits and attitudes individuals should learn or possess.

Personal qualities for success.

BOOKKEEPING

Balance sheets for financial farm operations.

Income and closing statements for farm operations.

First Year Second Semester

SUBJECT MATTER:

POMOLOGY

Selection of fruit trees.

Planting fruit trees.

Irrigation of fruit trees.

Disease, pest, insect control in fruit tree production.

Pollination of fruit trees.

Harvesting fruits.

Marketing fruit crops.

RABBIT PRODUCTION

Selection of meat characteristics and awareness of meat breeds in rabbits.

Reproduction, handling and care of rabbits.

Health and disease control in rabbit production.

Feeds and feeding practices for rabbit production.

Management practices in rabbit production.

Housing basic designs, buildings and hutches.

Record-keeping of production, breeding and performance records for bucks, does and weaners.

Slaughtering and marketing rabbit meat.

Second Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER:

BASIC GRAINS PRODUCTION

Identification of basic grain crops and nutritional information.

Production techniques.

Diseases, insects, pests and weed control in basic crop production.

Marketing basic grains.

FARM CONSTRUCTION AND REPAIR

Construction of basic animal housing.

Repair of animal facilities and fences.

POULTRY PRODUCTION

Selection, awareness of meat/egg producing breeds.

Reproduction in poultry production.

Health and disease control in poultry production.

Feeds and feeding for poultry production.

Poultry management, slaughtering and marketing poultry.

Housing in poultry production.

Record-keeping for poultry production.

Second Year Second Semester

SUBJECT MATTER:

INDUSTRIAL CROPS PRODUCTION

Identification of industrial crops.

Crop production techniques.

Diseases, insects, pests and weed control in crop production.

Harvesting crops.

Marketing industrial crops.

SWINE PRODUCTION

Selection of meat characteristics in swine.

Reproduction and care of swine.

Health and disease control in swine production.

Feeds and feeding practices for swine production.

Management practices in swine production.

Housing basic designing and basic facilities for swine.

Record-keeping for production and for animal movement purposes.

Marketing swine meat and swine products.

Third Year Agricultural Common Cycle Of General Culture

First Semester

SUBJECT MATTER:

BEEF CATTLE

Breeds - awareness of European breeds, as well as basic knowledge of Brahman/Zebu breeds and dual purpose breeds.

Management practices in beef production.

Health and disease control practices in beef production.

Reproduction, problems, care and handling of problems.

Parturition problems and handling.

Feeds and feeding for meat production.

Milk production and milk handling in beef and dual purpose cattle.

Record-keeping for production and animal movement purposes.

HORSES (Optional Course or Available Where Needed)

Care for horses and tack.

Riding horses and horse-shoeing.

Cattle rounding with horses.

Nutrition and sanitation practices.

Third Year Second Semester

SUBJECT MATTER:

DAIRY CATTLE

Awareness of major dairy as well as dual purpose breeds.

Management practices in dairy cattle production.

Health and disease control in dairy herds.

Reproduction in dairy cattle.

Parturition handling.

Feeds and feeding practices for milk production.

Milk production and milk handling.

Record keeping in dairy production.

Objective Three

The third objective was to develop a total program concept for implementation of curriculum. The curriculum model was developed from the survey results and the qualitative data identified in Chapter 3. The agricultural subjects were planned to be incorporated into the existing Common Cycle of General Culture curriculum and not to be added as separate subject areas.

Conclusions for Objective Three

The curriculum model was meant to be vocational in that it prepares people for work. It recognizes experience as the fundamental medium through which the students learn. Its emphasis was in the practical aspects and not in the theoretical components. The proposed curriculum model could be integrated into the Common Cycle of General Culture as follows:

Integrated Common Cycle Agricultural Curriculum

First Year

First Semester	Second Semester
* Mathematics/Bookkeeping/ Technical Drawing	Math/Tech.Drawing
* Natural Science/Horticulture	Nat.Science/Pomology and Rabbits
Spanish	Spanish
Social Studies (Includes Morale and Civics which could integrate Personal Behavior and Attitudes)	Social Studies

* Teach mathematics using bookkeeping and technical drawing to make it more relevant. Use natural science to teach horticulture, pomology, and rabbit production and have supervised group work experience as practical laboratories.

Integrated Second Year

First Semester	Second Semester
* Mathematics/Tech. Drawing (Could integrate Farm Construction and Repairs)	Math/Tech. Drawing
* Natural Science/Basic Grains/ Poultry	Nat.Sci./Industrial Crops/Swine
Spanish	Spanish
Social Studies	Social Studies

* Use mathematics to teach technical drawing and include farm constructions. Start individual supervised work experience in school farm. Use natural science to teach grain crops, poultry, and swine production.

Integrated Third Year

First Semester	Second Semester
* Mathematics/Tech. Drawing	Mathematics/Tech. Drawing
* Natural Science/Beef Cattle	Nat.Sci./Dairy Cattle
Spanish	Spanish
Social Studies	Social Studies
Horses (Optional and/or Where Needed)	

* Use mathematics to teach technical drawing, and natural science to teach beef, dairy, and horses.

Objective Four

The fourth objective was to develop recommendations for implementation of the following:

A. New curriculum in the rural Middle School system.

B. Teacher preparation program to meet the needs of the new program.

C. National and local administration personnel support workshops to develop the administration's awareness of the high priority of vocational agricultural education programs for economic development in the rural regions of Honduras.

Recommendations for Objective 4-A

Recommendations for implementation of the new curriculum in the rural Middle School system are as follows:

1. It is recommended that the agricultural curriculum be incorporated into the general curriculum at the Common Cycle of General Culture level of the rural schools, to accomplish the following purposes:
   a. To retain rural students in school after their primary education.

b. To benefit rural students by training them in agricultural skills so that they are able to return to their rural settings with better working skills.

c. To retain rural dwellers in their communities and to prevent migration to the cities.

2. It is recommended that the agricultural components be used as living applications of the general core to enhance learning. This might alleviate some of the current overloading of subject matter as is the case in the current educational system of Honduras where students take eight to ten courses per semester. It would also permit more in-depth treatment of subject matter with more time for practical work.

3. It is recommended that agricultural courses be prioritized according to local need in the rural schools, and that at the Common Cycle level, the emphasis be on the practical development of agricultural skills.

4. It is recommended that practical work be done using local materials and tools prevalent in Honduras. For example, students should be taught how to plow with oxen or with horses, not only with tractors, which are not common in Honduras.

5. It is recommended that supervised work experience be implemented by working in group projects and individual projects at school farms. Where feasible, individual projects should be done at family plots as beginning home enterprises.
6. It is recommended that group projects should start in the first year, first semester by working with horticulture. The second semester could be devoted to working with rabbits and pomology.
7. It is recommended that proposals for individual projects be done at the end of the second semester of the first year.
8. It is recommended that the individual project be started in the first semester of the second year and continued until the end of the third year.
9. It is recommended that results and financial data on the individual project be reported in writing prior to the obtainment of a diploma.
10. It is recommended that the agricultural curriculum be evaluated yearly to keep it relevant.
11. It is recommended that, in the program evaluation process, the agricultural and animal producers are always taken into consideration.
12. It is recommended that an Advisory Committee for program structure, curriculum emphasis and evaluation be formed. This committee should be

composed of technical personnel of government institutions dealing with agricultural education, government technical personnel dealing with agricultural loans, and the agricultural and animal producers.

13. It is recommended that there be a youth organization which has contests in technical skills, leadership, and business areas of the curriculum. The purpose of such an organization would be to help build proficiency in the skills taught and pride in working in agriculture.

Recommendations for Objective 4-B

The following are recommendations for teacher preparation to meet the needs of the new program:

1. A specialization program in agriculture should be implemented in the curriculum for elementary teacher preparation. To avoid cost and duplicity of subject matter teacher preparation courses should be taken at the Normal Schools, but all agricultural subjects should be taken at the agricultural technical schools. This would permit the future teachers to gain a more in-depth treatment of agricultural subjects and more practical work than is presently the case.

2. The teacher education curriculum should be flexible so that the future agricultural teachers for rural Honduras can take courses at the agricultural technical schools and be able to transfer credits to the Normal School prior to their certification.
3. Teachers should also take inservice courses in agriculture after they complete their certification requirements. This will keep them current in agricultural technology after graduation and initial certification.
4. Agricultural student teachers should have a year of practice teaching in rural schools prior to their teacher certification. This would develop agricultural and general education skills and knowledge appropriate to this specialized assignment.
5. Once trained, agricultural teachers should be offered incentives to teach and stay in the rural areas of Honduras.
6. There should be more rural Normal Schools with no sex separation throughout Honduras, for the preparation of specialized rural educators.
7. Include a supervised occupational experience program and a youth organization for leadership training in the teacher preparation program.

Recommendations for Objective 4-C

Recommendations to the national administration are as follows:

1. The administrators of the Ministry of Education should set up workshops to develop awareness of the high priority that agricultural programs have for economic development in the rural regions in Honduras.
2. If these programs are to succeed and provide the economic development potential inherent in their nature, the programs must have the financial support of the Ministry of Public Education in Honduras.
3. Administrators need inservicing so they know what the peasant farmers need. The discrepancies found in this study between producers and government technical personnel seem to indicate that administrators may not be in touch with the reality of rural farming conditions.

Recommendations for Objective 4-D

Institutionalization of the vocational agriculture education program should be implemented through making it an integral component of the lower level Middle School curriculum of Honduras. This would greatly benefit future farmers and farm laborers and the economic development of the Republic of Honduras.

There should be positions within the Ministry of Public Education for Agricultural Education Supervisors whose jobs requires visits to rural Agricultural Common Cycle Schools to provide assistance to teachers in:

1. Program planning.
2. Advisory Committee development.
3. Curriculum development.
4. Financial assistance procurement.
5. Supervised Occupational Experience program planning.
6. Youth organization planning.
7. Professional development planning.
8. Instructional laboratory planning, development and financing.

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APPENDICES

APPENDIX A

SURVEY INSTRUMENT

APPENDIX A

This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

I. BEEF AND DAIRY CATTLE

A. BREEDS

1. Identify breeds of cattle in the country.
2. Identify the main breeds imported to the country.
3. Describe advantages and disadvantages of the different breeds of cattle.

B. MANAGEMENT OF LIVESTOCK

1. Determine general condition of livestock.
2. Identify the behavior of sick and of normal cattle.
3. Gather cattle.
4. Determine the weight of cattle by tape measure.
5. Recognize normal temperature vs. fever in livestock.
6. Take temperature.
7. Operate cattle handling equipment that is not powered.
8. Restrain cattle.
9. Dehorn.
10. Brand or mark cattle.
11. Assist with castrating cattle.
12. Determine age of animal from teeth.

13. Trim feet of livestock.

14. Use chutes for working with cattle.

C. HEALTH AND DISEASE CONTROL

1. Identify the main common diseases of cattle in your country.

2. Describe the symptoms of each disease.

3. Treat the most common diseases.

4. Apply general sanitation measures for disease control.

5. Identify main external parasites.

6. Control main external parasites of cattle.

7. Identify main internal parasites of cattle.

8. Control main internal parasites of cattle.

9. Administer medication by injections.

10. Administer medication by drenching.

11. Make and follow vaccine calendars.

12. Vaccinate animals for disease prevention.

13. Nurse sick animals back to health.

14. Isolate sick animals.

15. Recognize the importance of quarantine laws for movement of animals.

D. REPRODUCTION

1. Recognize heat signs in cattle.

2. Supervise natural service breeding.

3. Explain techniques of artificial insemination.

4. Assist in performance of artificial insemination.

5. Describe the estrus cycle in cattle.

6. Apply vaginal and uterine boluses.

7. Make vaginal and uterine irrigations.

E. PARTURITION

1. Palpate.

2. Handle normal delivery.

3. Recognize signs of abnormal delivery.

4. Handle abnormal delivery.

5. Identify post-partum complications.

6. Care for newborn animals.

F. FEEDS AND FEEDING

1. Identify common feedstuffs available in your country.

2. Identify main feeds utilized for milk production.

3. Pasture management practices.

4. Select quality feeds.

5. Describe feeding systems.

6. Follow approved practices in feeding livestock.

7. Recognize the importance of good nutrition for beef and milk production.

G. MILK PRODUCTION AND MILK HANDLING

1. Milk cows by hand.

2. Follow correct milking procedures.

3. Recognize milking equipment.

4. Practice proper cleaning methods.

5. Describe importance of Pasteurization and health.

6. Describe different types of milking parlor systems.

H. RECORD KEEPING

1. Keep performance records for beef cattle.
2. Keep milk production records for dairy cattle.
3. Keep breeding records for beef and dairy cattle.
4. Keep feeding records for dairy cattle.
5. Keep health records for beef and dairy cattle.
6. Keep animal movement records (selling & purchases).

I. HORSES

1. Care for working horses, and tack.
2. Ride working horses.
3. Cattle rounding on horseback.
4. Proper nutrition for working horses.
5. Apply general sanitation measures for disease prevention of horses.
6. Horse-shoeing.
7. Construct fences.

J. OTHER ACTIVITIES

This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

II. MINOR SPECIES (SWINE, POULTRY, RABBITS)

A. SELECTION

1. Identify major swine breeds.
2. Identify major poultry breeds.
3. Identify major meat producing rabbit breeds.
4. Describe advantages and disadvantages of common breeds of swine, poultry and rabbits.
5. Select swine for meat production.
6. Select poultry for meat production.
7. Select poultry for egg production.
8. Select rabbits for meat production.

B. REPRODUCTION

1. Detect heat in sows and gilts.
2. Properly sex chicks.
3. Describe the reproductive cycle in swine, poultry and rabbits.
4. Identify the gestation periods of sows and does.
5. Properly handle and care for boars, and bucks at breeding.
6. Properly handle and care for sows and gilts at breeding.
7. Properly handle and care for gestating sows and does.

8. Breed does.

9. Palpate does.

10. Properly handle and care for sows and does at parturition.

11. Select eggs for hatching quality.

12. Operate incubation equipment.

13. Remove chicks from incubator.

C. HEALTH

1. Identify main diseases of swine.

2. Identify main diseases of poultry.

3. Identify main diseases of rabbits.

4. Describe symptoms of diseases.

5. Treat common diseases and ailments of swine, poultry and rabbits.

6. Apply general sanitation measures for disease control.

7. Identify sick and well animals by taking temperature or observation of behavior.

8. Administer medication by injections.

9. Vaccinate animals for disease prevention.

10. Identify external parasites in swine, poultry, and rabbits.

11. Control external parasites in swine, poultry, and rabbits.

12. Identify internal parasites in swine, poultry, and rabbits.

13. Control internal parasites in swine, poultry, and rabbits.

14. Isolate and nurse sick animals back to health.

15. Recognize the importance of quarantine laws for movement of animals.

D. FEEDS AND FEEDING

1. Identify common feedstuffs available in Honduras.
2. Select quality feedstuff.
3. Recognize the importance of good nutrition for swine, poultry, and rabbits.
4. Follow approved practices in feed handling and feeding of swine, poultry, and rabbits.

E. MANAGEMENT PRACTICES

1. Care for newborn animals.
2. Clip needle teeth of piglets.
3. Castrate piglets.
4. Administer iron shots to piglets at birth.
5. Balance litter numbers of piglets if necessary.
6. Clip tails of piglets if necessary.
7. Identify piglets by ear notches, tattoo, or ear tags.
8. Identify chicks by leg bands or wing bands.
9. Identify pups by tattoo or ear tags.
10. Weigh animals for growth records.
11. Estimate weights of piglets by tape measure.
12. Read ear notches in pigs.
13. Collect and store eggs.
14. Brood chicks.
15. Slaughter chicken.
16. Slaughter rabbits.

F. HOUSING

1. Determine housing needs of swine and poultry.
2. Build "basic" swine housing.
3. Build "basic" poultry housing.
4. Design "basic" hutches.
5. Build "basic" hutches.
6. Be familiar with different rabbitry designs.
7. Construct fences.

G. RECORD-KEEPING

1. Keep production and feed records for swine.
2. Keep production and feed records for poultry.
3. Keep breeding and farrowing records for swine.
4. Keep performance records for swine.
5. Keep production and feed records for rabbits.
6. Keep breeding and kindling records for rabbits.
7. Keep performance records for does and weaners.

H. MARKETING

1. Demonstrate knowledge of the area's market.
2. Package rabbit and poultry meat for marketing.
3. Market eggs.

I. OTHER ACTIVITIES

This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

III. BASIC GRAINS AND INDUSTRIAL CROPS

(Basic grains= corn, sorghum, rice, beans, soybeans, wheat; Industrial= cotton, bananas, tobacco, coffee, sugar cane)

A. IDENTIFICATION

1. Identify common crops of Honduras by vegetative growth.
2. Identify morphological characteristics of common crops with proper part names.
3. Identify crops by family, genus, and species.
4. Identify varieties of crops that are suitable for various sections of Honduras.

B. CROP PRODUCTION

1. Select high quality seed.
2. Identify sources of high quality seeds.
3. Describe the labor requirements for each crop.
4. Use appropriate cultural techniques for individual crops.
5. Use appropriate cultural practices to increase productivity.
6. Determine soil structure, texture, permeability.
7. Select suitable sites for each crop.
8. Determine appropriate planting season for individual crops.
9. Use soil testing to determine pH.

10. Take appropriate soil samples for nutrient and pH testing.

11. Understand crop adaptation in term factors related to soil, climate, and economics.

12. Correct drainage problems.

13. Cultivate crops by tillage methods.

14. Build drainage ditches.

15. Build fences.

16. Provide water by irrigation if necessary.

C. DISEASES, INSECTS, PESTS, WEEDS

1. Identify diseases of the region for each individual crop.

2. Identify main harmful rodents and insects for individual crops.

3. Control crop diseases and insects through chemical applications.

4. Control pests using appropriate methods.

5. Identify weeds and weed seeds commonly found in crops grown locally.

6. Use effective weed control methods including rotation, cultivation, and approved herbicides.

7. Apply chemicals as recommended.

8. Apply the proper fertilizer for each crop.

9. Determine appropriate time to apply a fertilizer to individual crops.

10. Determine alternative measures of fertilizer applications.

11. Substitute fertilizer ingredients according to economic and agronomic conditions.

12. Treat grain properly and safely for pest control.

13. Identify and classify insect/rodent damage.

14. Identify seed-borne diseases.

15. Describe and identify life cycles of insects and diseases.

16. Recognize water and/or nutrient deficiency symptoms.

D. HARVEST

1. Harvest grain or products in the appropriate season.

2. Harvest crops in their appropriate maturity state.

3. Classify grains.

4. Store crops/products adequately.

E. MARKETING

1. Demonstrate knowledge of local market (prices, preferences).

2. Recognize season of highest prices, higher demand.

3. Package crop/product appropriately for marketing.

F. OTHER ACTIVITIES

This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

IV. HORTICULTURE

A. IDENTIFICATION

1. List vegetables requiring direct planting.
2. List vegetables requiring indirect planting.
3. List advantages and disadvantages of monoculture.
4. List advantages and disadvantages of diversification.
5. Describe importance of vegetables as food and in diets.

B. VEGETABLE CROP PRODUCTION

1. Use proper techniques for vegetable seedling planting.
2. Use appropriate techniques for transplanting seedlings.
3. Determine soil structure, texture and permeability.
5. Select suitable planting site for variety of vegetable.
6. Provide adequate soil water by irrigation when needed.
7. Determine appropriate planting season for individual vegetable crops.
8. Apply appropriate cultural techniques for individual vegetable crops.

C. PESTS, INSECTS, WEEDS, AND PLANT DISEASE CONTROL

1. Identify main plant diseases of the area for individual vegetable crops.
2. Recognize nutrient deficiency symptoms for each individual vegetable crops.
3. Recognize water deficiency symptoms.
4. Identify and recognize main harmful insects for individual vegetable crops.
5. Identify weeds and their seeds.
6. Control insects and rodents using appropriate methods.
7. Control vegetable diseases using appropriate methods.
8. Use effective weed control methods, including crop rotation, cultivation and approved herbicides.

D. AGRI-CHEMICALS

1. Use appropriate methods for insecticide, bactericide, fungicide, and herbicide applications.
2. Apply agri-chemicals as recommended.
3. Use safety-precautions when handling agri-chemicals.
4. Be aware of contamination symptoms, residuals, and antidotes that can be used.

E. HARVESTING

1. Harvest vegetables at proper stage.
2. Harvest vegetables at proper time for each crop.
3. Sort vegetables.
4. Store vegetables properly.

F. MARKETING

1. Package vegetables adequately when needed.

2. Demonstrate knowledge of local market (preferences, prices, etc.).

3. Demonstrate knowledge of seasonal shortages, best-priced seasons.

4. Market vegetables.

G. OTHER ACTIVITIES

This is a list of different activities that are commonly needed in the agricultural sector. Please write an "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

V. POMOLOGY (TREE FRUIT GROWING)

A. SELECTION

1. Select appropriate varieties of fruit trees adapted to soil and climate of the area.
2. Select site having adequate water for irrigation.
3. Select site having adequate water drainage.
4. Select appropriate site according to variety of fruit tree.

B. PLANTING

1. Determine soil structure, texture, and permeability.
2. Prepare site for planting fruit trees.
3. Add organic matter to soil where needed.
4. Utilize soil analysis for pH determination.
5. Apply fertilizer to soil with the appropriate technique.
6. Apply lime to the site if needed.
7. Select appropriate grafting materials (wood and tool).
8. Be able to apply different grafting techniques.

C. IRRIGATION

1. Prepare soil to receive irrigation water.

2. Apply irrigation water according to fruit tree variety.

D. DISEASE, PEST, AND INSECT CONTROL

1. Identify main diseases of each fruit tree variety.
2. Identify main insects of each fruit tree variety.
3. Follow directions in the use of insecticides and fungicides.
4. Protect wounds on trees.
5. Make and follow a disease and insect program.
6. Select disease resistant varieties where available.
7. Use traps to anticipate a rise in insect population.
8. Recognize nutrient and/or water deficiency symptoms in the trees and/or in the fruits.
9. Efficiently control rodents and birds in orchards.

E. POLLINATION

1. Assure adequate pollination by use of bees where appropriate.
2. Assure adequate pollination by use of varieties where appropriate.
3. Thin fruit by hand.

F. HARVESTING

1. Determine optimum time to harvest fruit crop.
2. Determine most appropriate method of harvesting fruit.
3. Harvest fruits in the appropriate state of growth and maturity.

G. MARKETING

1. Determine method of selling fruit crop.
2. Demonstrate knowledge of local market (preferences, prices).
3. Demonstrate knowledge of season of best prices, most demand.
4. Classify fruit after harvesting.
5. Package fruit crop adequately.
6. Sell fruit crop.

H. OTHER ACTIVITIES

This is a list of different activities that are commonly needed in the agricultural sector. Please write and "X" next to the activities which you consider are needed to be able to work efficiently on your farm. If an activity is missing, please write it down at the end.

VI. FARM CONSTRUCTION

A. CONSTRUCTION AND REPAIR

1. Design and build basic swine buildings.
2. Design and build basic poultry buildings.
3. Design and build basic rabbitries.
4. Build farm fences.
5. Use working tools properly.
6. Repair and sharpen working tools.
7. Use a farm level for land surveys.
8. Use land surveys for measuring terrains.
9. Repair fences.
10. Repair farm buildings when necessary.
11. Build animal restraint chutes.
12. Build livestock feeders/waterers.
13. Repair livestock feeders/waterers.

B. OTHER ACTIVITIES

VII. AGRICULTURAL BOOKKEEPING

1. Open bookkeeping books.
2. Use main types of bookkeeping movements for a farm.
3. Make balance sheets.
4. Close the accounts.

B. OTHER ACTIVITIES

This is a list of different attitudes and personal habits that are necessary in the agricultural sector to form personnel who are responsible and who can take care of a farm. Please write an "X" next to what you as an employer consider important. If something is missing, please write it down at the end.

VIII. PERSONAL BEHAVIOR AND ATTITUDES

A. WORK HABITS AND ATTITUDES

1. Organize time and work.
2. Adapt to new situations.
3. Demonstrate business-like attitude.
4. Demonstrate respect for authority.
5. Demonstrate respect for fellow workers.
6. Demonstrate respect for farmers.
7. Demonstrate safe-working attitude.
8. Demonstrate positive and friendly attitude.
9. Dress with cleanliness, and appropriate to the job.
10. Demonstrate cooperation with employers and fellow workers.

B. PERSONAL QUALITIES FOR SUCCESS

1. Demonstrate self-confidence.
2. Be honest.
3. Be punctual.
4. Fulfill promises.
5. Always be truthful.
6. Try to improve personally and professionally.
7. Get to work without being intoxicated.

C. OTHER ATTITUDES/HABITS NEEDED

APPENDIX B

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE

APPENDIX B

TABLE B-1

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR MAJOR SPECIES

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Breeds	1	100.00	75.00	30.00
	2	100.00	75.00	30.00
	3	90.00	75.00	26.67
Management	1	80.00	62.50	93.33
	2	90.00	100.00	100.00
	3	100.00	75.00	100.00
	4	70.00	100.00	76.67
	5	100.00	100.00	100.00
	6	100.00	100.00	93.33
	7	100.00	100.00	100.00
	8	100.00	100.00	93.33
	9	100.00	100.00	70.00
	10	80.00	100.00	93.33
	11	100.00	100.00	70.00
	12	80.00	81.25	76.67
	13	90.00	62.50	60.00
	14	100.00	93.75	80.00
Health	1	80.00	100.00	66.67
	2	50.00	81.25	76.67
	3	50.00	75.00	100.00
	4	100.00	100.00	100.00
	5	100.00	93.75	93.33
	6	100.00	100.00	100.00
	7	50.00	75.00	66.67
	8	60.00	93.75	86.67
	9	100.00	100.00	100.00
	10	100.00	100.00	100.00
	11	70.00	75.00	86.67
	12	100.00	100.00	70.00
	13	100.00	100.00	100.00
	14	100.00	100.00	100.00
	15	100.00	75.00	50.00

TABLE B-1 (Cont.)

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR MAJOR SPECIES

Section	Question Number	Government Sources Dealing with: Education	Loans	Producers
Reproduction	1	100.00	100.00	100.00
	2	40.00	62.50	66.67
	3	90.00	75.00	66.67
	4	100.00	100.00	60.00
	5	100.00	100.00	70.00
	6	100.00	100.00	73.33
	7	100.00	100.00	60.00
Parturition	1	100.00	100.00	63.33
	2	100.00	100.00	100.00
	3	100.00	100.00	100.00
	4	100.00	100.00	60.00
	5	100.00	100.00	70.00
	6	100.00	100.00	100.00
Feeds & Feeding	1	100.00	100.00	93.33
	2	100.00	100.00	100.00
	3	100.00	100.00	100.00
	4	100.00	100.00	70.00
	5	100.00	100.00	66.67
	6	100.00	100.00	100.00
	7	100.00	100.00	100.00
Milk Production	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
	3	100.00	100.00	70.00
	4	100.00	100.00	100.00
	5	100.00	100.00	50.00
	6	100.00	100.00	23.33
Record Keeping	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
	3	100.00	100.00	100.00
	4	100.00	100.00	100.00
	5	100.00	100.00	100.00
	6	100.00	100.00	73.33
Horses	1	70.00	62.50	63.33
	2	70.00	68.75	66.67
	3	60.00	56.25	66.67
	4	60.00	50.00	63.33
	5	60.00	50.00	60.00
	6	50.00	31.25	60.00
	7	100.00	100.00	100.00

TABLE B-2

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR MINOR SPECIES

Section	Question Number	Government Sources Dealing with: Education	Loans	Producers
Selection	1	100.00	100.00	45.45
	2	100.00	100.00	18.18
	3	100.00	100.00	13.64
	4	100.00	100.00	36.36
	5	100.00	100.00	50.00
	6	100.00	100.00	31.82
	7	100.00	100.00	31.82
	8	100.00	100.00	13.64
Reproduction	1	100.00	100.00	45.45
	2	100.00	100.00	9.09
	3	100.00	100.00	54.55
	4	100.00	100.00	54.55
	5	100.00	100.00	54.55
	6	100.00	100.00	59.09
	7	100.00	100.00	68.18
	8	100.00	100.00	18.18
	9	100.00	100.00	18.18
	10	100.00	100.00	18.18
	11	100.00	81.25	9.09
	12	100.00	62.50	4.55
	13	100.00	62.50	4.55
Health	1	100.00	100.00	54.55
	2	100.00	100.00	27.27
	3	100.00	62.50	13.64
	4	100.00	100.00	81.82
	5	100.00	75.00	90.91
	6	100.00	100.00	100.00
	7	100.00	100.00	100.00
	8	100.00	100.00	81.82
	9	100.00	100.00	90.91
	10	100.00	75.00	59.09
	11	100.00	75.00	59.09
	12	100.00	62.50	40.91
	13	100.00	62.50	90.91
	14	100.00	100.00	100.00
	15	100.00	75.00	59.09

TABLE B-2 (Cont.)

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR MINOR SPECIES

Section	Question Number	Government Sources Dealing with: Education	Loans	Producers
Feed & Feeding	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
	3	100.00	100.00	90.91
	4	100.00	100.00	100.00
Management	1	100.00	100.00	81.82
	2	80.00	75.00	27.27
	3	100.00	100.00	36.36
	4	100.00	93.75	27.27
	5	80.00	62.50	27.27
	6	80.00	62.50	27.27
	7	100.00	100.00	31.82
	8	50.00	25.00	9.09
	9	100.00	62.50	13.64
	10	100.00	100.00	59.09
	11	50.00	31.25	13.64
	12	80.00	62.50	27.27
	13	100.00	100.00	27.27
	14	100.00	100.00	27.27
	15	100.00	100.00	13.64
	16	100.00	56.25	13.64
Housing	1	70.00	75.00	36.36
	2	100.00	87.50	40.91
	3	100.00	37.50	13.64
	4	100.00	37.50	13.64
	5	100.00	37.50	13.64
	6	20.00	6.25	4.55
	7	100.00	100.00	90.91
Record Keeping	1	100.00	100.00	40.91
	2	100.00	100.00	31.82
	3	100.00	100.00	45.45
	4	100.00	100.00	45.45
	5	100.00	43.75	13.64
	6	50.00	43.75	13.64
	7	50.00	43.75	13.64
Marketing	1	100.00	62.50	68.18
	2	60.00	62.50	18.18
	3	50.00	37.50	18.18

TABLE B-3

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR GRAIN CROPS

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Identification	1	100.00	81.25	66.67
	2	80.00	43.75	33.33
	3	80.00	31.25	20.00
	4	80.00	31.25	26.67
Production	1	100.00	62.50	33.33
	2	80.00	62.50	66.67
	3	100.00	100.00	100.00
	4	100.00	100.00	100.00
	5	100.00	100.00	93.33
	6	100.00	81.25	66.67
	7	100.00	100.00	80.00
	8	100.00	100.00	80.00
	9	100.00	62.50	53.33
	10	100.00	100.00	66.67
	11	100.00	81.25	53.33
	12	100.00	93.75	80.00
	13	100.00	100.00	53.33
	14	100.00	100.00	80.00
	15	100.00	100.00	80.00
	16	100.00	100.00	80.00
Diseases, Pests	1	100.00	62.50	73.33
	2	100.00	87.50	66.67
	3	100.00	100.00	80.00
	4	100.00	100.00	80.00
	5	100.00	62.50	33.33
	6	100.00	100.00	80.00
	7	100.00	100.00	80.00
	8	100.00	93.75	80.00
	9	100.00	100.00	66.67
	10	100.00	62.50	53.33
	11	100.00	31.25	20.00
	12	100.00	62.50	33.33
	13	100.00	100.00	53.33
	14	100.00	100.00	53.33
	15	100.00	62.50	20.00
	16	100.00	62.50	66.67

TABLE B-3 (Cont.)

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR GRAIN CROPS

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Harvest	1	100.00	100.00	80.00
	2	100.00	100.00	66.67
	3	100.00	62.50	33.33
	4	100.00	100.00	80.00
Marketing	1	70.00	62.50	26.67
	2	60.00	62.50	26.67
	3	100.00	100.00	80.00

TABLE B-4

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR HORTICULTURE

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Identification	1	100.00	75.00	83.33
	2	100.00	75.00	83.33
	3	100.00	75.00	41.67
	4	100.00	62.50	41.67
	5	100.00	62.50	50.00
Production	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
	3	80.00	62.50	33.33
	4	80.00	62.50	33.33
	5	100.00	93.75	83.33
	6	100.00	100.00	100.00
	7	100.00	100.00	100.00
	8	100.00	100.00	100.00
Diseases, Pests	1	100.00	75.00	83.33
	2	100.00	50.00	83.33
	3	100.00	100.00	100.00
	4	100.00	62.50	83.33
	5	100.00	62.50	100.00
	6	100.00	62.50	83.33
	7	100.00	62.50	100.00
	8	100.00	100.00	100.00
Agri-Chemicals	1	100.00	100.00	83.33
	2	100.00	100.00	83.33
	3	100.00	100.00	100.00
	4	100.00	75.00	66.67
Harvesting	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
	3	100.00	100.00	83.33
	4	100.00	100.00	100.00
Marketing	1	80.00	62.50	41.67
	2	80.00	62.50	41.67
	3	100.00	62.50	33.33
	4	100.00	62.50	16.67

TABLE B-5

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR POMOLOGY

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Selection	1	100.00	100.00	72.73
	2	100.00	100.00	72.73
	3	100.00	100.00	90.91
	4	100.00	100.00	63.64
Planting	1	100.00	93.75	54.55
	2	100.00	100.00	100.00
	3	100.00	93.75	100.00
	4	100.00	100.00	36.36
	5	100.00	100.00	100.00
	6	100.00	100.00	90.91
	7	100.00	100.00	100.00
	8	100.00	100.00	100.00
Irrigation	1	100.00	100.00	100.00
	2	100.00	100.00	100.00
Diseases, Pests	1	100.00	75.00	90.91
	2	100.00	100.00	90.91
	3	100.00	100.00	100.00
	4	100.00	100.00	81.82
	5	100.00	100.00	90.91
	6	100.00	100.00	100.00
	7	50.00	25.00	54.55
	8	100.00	68.75	90.91
	9	100.00	62.50	100.00
Pollination	1	50.00	18.75	18.18
	2	60.00	25.00	27.27
	3	100.00	100.00	100.00
Harvesting	1	100.00	100.00	100.00
	2	40.00	31.25	54.55
	3	100.00	100.00	72.73
Marketing	1	100.00	100.00	18.18
	2	100.00	100.00	36.36
	3	100.00	100.00	36.36
	4	100.00	100.00	100.00
	5	100.00	100.00	90.91
	6	30.00	37.50	18.18

TABLE B-6

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR FARM CONSTRUCTION

Section	Question Number	Government Sources Dealing with: Education	Loans	Producers
Construction and Repair	1	40.00	62.50	20.00
	2	100.00	100.00	33.33
	3	100.00	100.00	10.00
	4	100.00	100.00	100.00
	5	100.00	100.00	100.00
	6	100.00	75.00	76.67
	7	100.00	93.75	70.00
	8	100.00	100.00	83.33
	9	100.00	100.00	100.00
	10	100.00	100.00	100.00
	11	80.00	62.50	50.00
	12	100.00	93.75	80.00
	13	100.00	100.00	100.00

TABLE B-7

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR AGRICULTURAL BOOKKEEPING

Section	Question Number	Government Sources Dealing with: Education	Loans	Producers
Bookkeeping	1	60.00	62.50	50.00
	2	60.00	62.50	50.00
	3	100.00	100.00	100.00
	4	60.00	62.50	50.00
	5	60.00	62.50	50.00

TABLE B-8

PERCENTAGE OF "YES" RESPONSES FOR INDIVIDUAL QUESTIONS BY SECTION AND RESPONSE SOURCE FOR PERSONAL BEHAVIOR

Section	Question Number	Government Sources Dealing with		
		Education	Loans	Producers
Habits and Attitudes	1	100.00	100.00	70.00
	2	100.00	100.00	100.00
	3	100.00	100.00	100.00
	4	100.00	100.00	100.00
	5	100.00	100.00	100.00
	6	100.00	100.00	100.00
	7	100.00	100.00	100.00
	8	100.00	100.00	83.33
	9	100.00	100.00	83.33
	10	100.00	100.00	100.00
Qualities for Success	1	100.00	100.00	93.33
	2	100.00	100.00	100.00
	3	100.00	100.00	100.00
	4	100.00	100.00	100.00
	5	100.00	100.00	100.00
	6	100.00	100.00	93.33
	7	100.00	100.00	100.00