

highest when students are motivated to perform the skill, demonstrations are provided which can be imitated by students, both physical and mental practice are provided, and knowledge of performance results is provided; and (4) retention and transfer of psychomotor skills may be improved through these same teaching methods.

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INTERNATIONAL AGRICULTURE AGRICULTURAL EDUCATION IN MALI

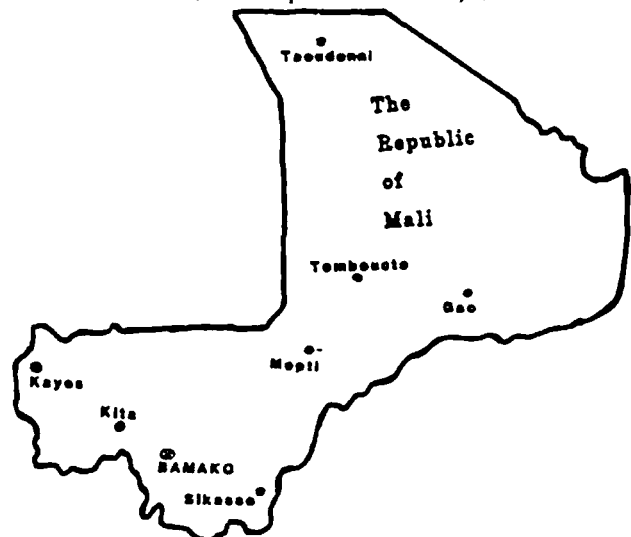
James E. Diamond

Increased agricultural production is one of the primary development goals in the Republic of Mali (Houze, 1979). Widespread agricultural education is an important component of the country's developmental strategies. The contribution of Moniteurs d'Agricole (Cooperative Extension agents) in disseminating information and in introducing new cultivation methods, crop varieties, and livestock management techniques is considered essential to efficient agricultural production (Diamond, 1981). Moniteurs d'Agricole are the village junior-level technicians directly responsible for implementing village agricultural development projects. Qualified students interested in careers as Moniteurs d'Agricole must complete a two-year formal training program at one of three different agricultural training centers (Centres d'apprentissage agricole, CAA) and a one-year internship program at one of three different specialized centers (Centre de Specialization, CS). This article will give some insight into the agricultural education program for training Moniteurs d'Agricole in the Republic of Mali.

The Republic of Mali, located between 10° and 26° north latitude and between 4° and 12° west longitude, covers about 465,000 square miles that include the upper basin of the Senegal River and the middle stretches of the Niger River. Mali, the largest coun-

try in West Africa, is landlocked and bordered by Senegal, Mauritania, Algeria, Niger, Upper Volta, the Ivory Coast, and Guinea.

Mali has approximately 6,500,000 inhabitants, most of whom live in the south, with an average population growth of 2.3% per year (Planton, 1979). There are two distinct climatic zones—the Sahelian, north of the 15° north latitude, and the Sudanese to the south. The Sahelian climate is more arid than the Sudanese. Mali has three principal seasons: (1) the rainy season, lasting from June to September or October, depending upon the latitude; (2) the cool dry season, lasting from October or November to February; and (3) the hot dry season, lasting from March to June. After the rainy season, the Harmattan winds (dry trade winds from the northeast desert regions) blow often, causing severe dust clouds. On the whole, Mali is relatively flat. The lowest point in the country is 25 m above sea level (on the Senegal River), while the only mountain worthy of note is Mount Hombori, whose peak reaches 1,155 m



Diamond is assistant professor of Agricultural and Extension Education at The Pennsylvania State University, University Park, PA 16802.

Agricultural Training Centers

The government of the Republic of Mali (GRM) currently operates three Centers d'Apprentissage (CAA's). These agricultural training Centers are designed to provide Agricultural and Extension Education for Moniteurs d'Agricole. Each CAA is associated with a former state farm and is coordinated by the Division of Technical Agricultural Education, an integral part of the Division of National Agriculture, one of three Divisions within the Ministry of Agriculture. The CAAs are located in three different ecological zones of Mali; this permits each center to focus on the cultivation of different crops, varying agronomic and horticultural practices, and the various types of animal husbandry. While the centers may not provide practical experience with all types of agriculture practiced in Mali, they do offer a broader range of experience than would a single-center approach. The CAA's are at Same, M'Pessoba, and Samanko.

Great strides have been made since 1981 to enhance the CAA programs. A 1984 evaluation team reporting the progress of a US/AID project, titled "Mali Agricultural Officers Training Program," noted the following major achievements:

1. "The growth of a sense of purpose and professionalism in the CAA system ... This new attitude pervades all parties to the CAA system: faculty, staff and students. Its importance should not be underestimated."

2. "The solid beginnings of a general shift in pedagogy away from the theoretical, rote memorization style towards an integration of theory and practice with growing emphasis on hands-on training."

3. "The completion of curriculum revisions in half the courses, bringing course curricula into line with both the realities of Mali agricultural context and the aims of the new competency-based pedagogy."

A team of experts contracted by US/AID through the South-East Consortium for International Development (SECID) are to be applauded for these far reaching achievements.

Students are admitted to the CAAs on the basis of their grades on the "Concours d'Entree," an exam based on traditional French academic criteria (e.g., language, math, and science). The number of students applying for entry into the CAAs is estimated to be ten times the number of openings (the ratio was 175 per 1000 in 1983). The current method of selecting students is to offer enrollment to only those who score highest on the exam. More than half of the present cadre of students in the CAA system have nonfarm backgrounds (US/AID, 1984). Some 400 students are enrolled in the three CAAs and three CSs, many from the urban areas of Mali. Interviews with the CAA students show they genuinely believe that the work of a Moniteur d'Agricole is important for Malian agriculture and that

their curriculum will adequately prepare them for such work (Houtz, 1979; Diamond, 1981, 1983; US/AID, 1984).

Curriculum

Curriculum, as applied to the two-year CAA program, is defined as the subject emphasis areas and the coordination among educational activities that produce a holistic curriculum (US/AID, 1984). The current ongoing curriculum is divided into three segments: a basic technical core consisting of various courses in crops, animal science, and economics; an emphasis in extension education; and a strong practicum program intended to support the technical components of the curriculum. Twenty-four courses listed in Table 1 are taught to impact a basic, general understanding of various agricultural principles. In Table 2 is an outline of the CAA curriculum and the number of hours per week and per year for the two years of study.

Table 1. Courses offered during two years of formal education at each CAA

Extension Education 1	Soil Fertilization
Extension Education 2	Botany 1 (Morphology, Anatomy, Reproduction)
General Economics	Botany 2 (Physiology and Ecology)
Rural Economics	Vegetable Production
Anatomy and Physiology	Vegetable Pests 1 (Insects and Animals)
Animal Husbandry	Vegetable Pests 2 (Diseases and Weeds)
Livestock Reproduction	Fruit Crops
Feeds and Feeding	Fiber Crops
Animal Health	Grain Crops
Animal Products	Topography
Introduction to Soils	Farm Management
Soil Management	Agricultural Mechanics

Source: US/AID Project Evaluation Report, 1984.

Diamond (1981) and Houtze (1979) suggested in their writings that the CAA curriculum designed by an International Labor Organization (ILO) team in the early 1960s needed to be revised and updated. The ILO team developed a booklet for each academic subject. The content of these booklets tended to be too comprehensive for the kind of work the CAAs are preparing their graduates to do. These materials were academic in nature, their abstract European concepts containing little or no emphasis on applying theory to practice.

Table 2. 1983-84 CAA Curriculum Outline

Subject Area	Year One		Year Two	
	hrs./wk.	hrs./yr.	hrs./wk.	hrs./yr.
Vegetable Production	6	216	6	216
Animal Science	3	108	3	108
Economics	1	36	1	36
Extension Education	1	36	1	36
General Education	5	180	5	180
Practicum	18	648	18	648
Individual Work and Study	5	180	5	180
Study	5	180	5	180
Sports	1	36	1	36
	45	1620	45	1620

Source: US/AID Project Evaluation Report, 1984.

The teaching strategies implemented at the CAAs evolved from the French educational system. Within this system, basic training was presented using the lecture-teaching method and the ILO booklets as a reference. Often the subject matter was based only on the notes instructors had taken when they were students.

Teacher Training

The level of training for the CAA teachers varies considerably. The Moniteurs d'Agricole have the lowest level of training whereas the Ingenieurs des Travaux Agricole (Agricultural Engineers) have the highest level. While many of the CAA teachers are young, undertrained and unexperienced, much progress has been made since 1981 through an annual two-week inservice seminar and workshop sponsored by USAID/SECID/DETA-FP. The SECID team of experts has influenced the adoption of regular lesson planning by the teachers. Whereas teachers used to read from their notes or simply copied them on the blackboard, they now write a lesson plan based on behavioral objectives. Whereas teachers previously discussed plows in the abstract, they now display a real plow as part of the lesson.

Further Student Training

After completing two years of intensive study at the CAAs, students must complete a one-year internship at one of three Specialized Centers (Centres des Specialization, CS). The CSs are located at Baguinda, Dioro, and Kita.

Students who successfully complete the three year program receive a "Certificat d'Aptitude Professionale Agricole." They are then usually employed by one of several government owned companies. The regionally based companies are concerned primarily with only one or two commodities and are responsible for all phases of production for their commodity (i.e. seeds, financing, fertilizer, harvesting, marketing).

The Moniteurs d'Agricole supervise and serve as liaison between the company and the farmer. They arrange for the technical agricultural training of village farmer. Through demonstrations and other extension techniques they provide farmers with a particular commodity production "package" sponsored by their company. At harvest time, the Moniteurs d'Agricole also arrange for the marketing of the crops.

Benefits

The benefits of agricultural education and training are slow in becoming tangible. However, the CAA students, instructors, and curricula are the catalysts for improving the dissemination of information and the transmission of modern agricultural technology to Malian farmers. The CAA instructors and CS coordinators are committed to fulfilling their responsible roles for training Moniteurs d'Agricole. The curriculum and teaching methodology are being designed both to prepare students for the varying realities of Malian agriculture and to meet the individual farmers' needs.

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Teaching Horticulture With a Human Perspective

Madeline Zadik

Introduction

The pleasure and satisfaction that people derive from plants and the growing of them, presents a difficult perspective for the teaching of horticulture. *Social Perspectives in Horticulture* is being designed and suggested as an introductory course that stresses the human aspects of horticulture. Starting with an exploration of human responses to vegetation and nature, it traces the development of gardens and the roles that plants and gardens have played in people's lives through history and in various cultures. Landscape design and aesthetics are becoming important elements in the transformation of natural areas into built environments. The effective use of plants in our homes, shopping malls, office buildings, residential communities, highways, and urban areas has the potential to enhance the quality of human life. We need to develop an awareness of how people interact with plants and how plants affect us. The aim of stressing this human perspective is to promote a better understanding of the role that horticulture might play in today's rapidly changing world.

There is a danger today, as we greatly expand all the boundaries of knowledge, that people become so involved in their work that their view may become constricted and they may lose sight of the larger world around them. This danger also exists in horticulture where we may become so focused on the plants that we forget why we are growing them. It is important to keep in perspective our concern about plants and how research ties in with this. Obviously, research and production are vital elements of horticulture, but they must exist within the broader context of the scope of horticulture, that is, that we are studying and growing plants because people like (or need) them.

Environmental issues, urbanization, and world hunger problems concern us all and must be addressed in the classroom. Today horticulture can no longer