

REPORT TO:

TA 78-02

AID/W  
USAID/EQUADOR  
GOVT. OF EQUADOR  
MAG/EQUADOR

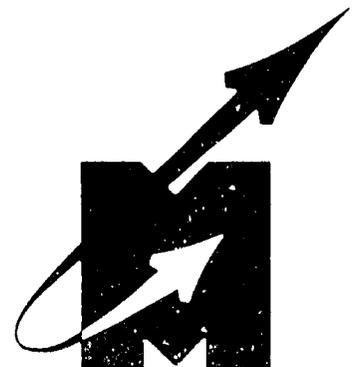
INTENSIVE COURSE FOR POSTGRADUATE TRAINING  
IN  
SEED PRODUCTION, CERTIFICATION AND QUALITY EVALUATION  
IN  
EQUADOR

APRIL 29 - MAY 19, 1978

Services Rendered  
Under The Agreement  
Between  
AID/W and MSU  
AID/ta-C 1219

MAY, 1978

SEED TECHNOLOGY LABORATORY  
MISSISSIPPI STATE UNIVERSITY  
MISSISSIPPI STATE, MISSISSIPPI



REPORT TO:

AID/W, USAID/F AND GOE (MAG)

on the

**Intensive Course for Postgraduate Training In  
Seed Production, Certification and Quality Evaluation**

**in**

**Ecuador**

**April 29 - May 19, 1978**

**Services Rendered  
Under the Contract Between  
AID/W and MSU  
AID/ta-C-1219**

**Seed Technology Laboratory  
Mississippi State University  
Mississippi State, Mississippi**

**May, 1978**

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**TITLE:** Intensive Course for Postgraduate Training in Seed Production, Certification and Quality Evaluation in Ecuador.

**CONTRACT:** AID/ta-C-1219 with Mississippi State University

**CONSULTANTS:** C. E. Vaughan and C. H. Andrews  
Seed Technology Laboratory  
Mississippi State University  
Mississippi State, Mississippi

**PERIOD OF CONSULTATION:** April 29 - May 19, 1978

### Summary

The USAID/Ecuador requested and the contract project manager approved the services of two senior seed technologists from MSU's Seed Technology Laboratory to prepare and present an intensive training course on seed production, certification and quality evaluation for Ecuador. Drs. C. H. Andrews and C. E. Vaugahn were nominated by the contractor to fulfill this assignment. These consultants departed their duty station (MSU) on April 29 and returned on May 19, 1978.

Twenty-five Ecuadorian technicians attended the course and completed all the requirements satisfactorily. These technicians were selected from the strategic seed agencies and areas over the entire country. (Appendix A gives names and addresses of participants).

No serious problems were encountered by either the instructors or the participants. The course was presented in English; however, effective translation was performed by Ing. Jaime Flores and Ing. Fernando Gomez. The enthusiasm and receptivity demonstrated by the participants was excellent.

Lecture and laboratory discussions and practical exercises were presented in the seed technology areas of production, certification, field inspection, germination, drying, storing, treating, harvesting and quality control and evaluation (Appendix B for complete course outline).

RECOMMENDATIONS

1. EM Semillas and/or the MAG/E should concentrate on in-country training programs in all phases of seed technology in major seed producing regions.
2. Efforts should be made to stabilize the seed positions in various agencies so that the trained technicians will remain in that position. This is the seventh training course since 1969.
3. Ecuador should select technicians for advanced degree training in the U.S. or some other country, possibly Brazil, in order to build up their core of trained seed technologists.
4. Ecuador should contact CIAT, Colombia to investigate possible cooperative training programs.

## ACKNOWLEDGMENTS

The consultants appreciate the administrative efforts of Ing. Jaime Flores for organizing and setting up the overall program. In addition Ing. Flores served very well as one interpreter for the course.

The consultants also wish to recognize the untiring efforts of Ing. Fernando Gomez as he acted very effectively as a translator and a day to day companion. We are also especially grateful to Ing. Luiz Cruz for his friendship and helpful advice. In addition Ing. Flavio Andrade provided day to day assistance in securing supplies and necessary teaching equipment.

The consultants also wish to express their sincere appreciation to all of the participants whose cooperation, attention, patience, and hard work was the basis for the success of this course.

The consultants certainly appreciate the cordial reception and brief orientation of Mr. Joe Sconce, USAID/Ecuador.

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C. H. Andrews

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C. E. Vaughan



Participants and instructors in the training course.



Dr. Vaughan, with translators Ing. Flores and Ing. Gomez, discusses and conducts practical exercise in seed analysis.

Report to  
AID/W, USAID/E and GOE

on the

Intensive Course for Postgraduate Training  
in Seed Production, Certification and  
Quality Evaluation in Ecuador

April 29 - May 19, 1978

#### TERMS OF REFERENCE

USAID/Ecuador requested the services of two consultants from the MSU/AID Contract (AID/ta-C-1219) for the purpose of presenting a 2-week training course in seed production, certification and quality evaluation in Ecuador. Drs. C. H. Andrews and C. E. Vaughan were nominated by the contractor to provide the technical assistance. They departed from their duty station on April 29 and returned on May 19.

#### BACKGROUND

The Government of Ecuador with the support of USAID/Ecuador, the Rockefeller Foundation and, more recently, IBRD, is in the process of developing a seed program to serve the people of Ecuador. This attempt to develop a progressive seed program in Ecuador was resumed in a concentrated effort in 1969 when a three-week training course in general seed technology was conducted followed by a one month training program in field inspection and seed production in 1971. Since then 4 training courses have been presented, and this current one constitutes the seventh such course. Additional assistance to the GOE has been in the areas of advising on the selection of seed processing and testing equipment and in designing some seed facilities.

#### IMPLEMENTATION

Prior to their departure, the MSU consultants prepared and assimilated pertinent lecture materials and illustrative 35 mm colored

slides for all of the course topics. In addition, a limited quantity of laboratory supplies and expendable materials were included, since all of the necessary materials were not available in Ecuador. The course topics were presented in English; however, two very capable interpreters, Ing. Jaime Flores and Ing. Fernando Gomez, served as translators.

During the two week intensive course, instruction was presented in the general areas of seed production, testing, certification, harvesting, drying, storage, processing and quality evaluation (See Appendix B for detailed course outline).

#### Seed Quality Evaluation

Purity and germination testing procedures and techniques were discussed and demonstrated, and practical exercises were conducted on soybeans, barley, corn and wheat. The seed samples were previously prepared by the Ecuadorian program coordinators to represent various conditions of contamination, i.e., weed seeds, inert matter and other crop contaminants. In addition, seed samples with different germination levels were prepared. Each participant was given a numbered sample, and their effectiveness in determining the quality level, purity and germination, was thus determined. This technique proved to be quite effective in evaluating each participant's level of understanding.

Other quality evaluation tests were discussed, and the tetrazolium test was demonstrated and used in a practical exercise on corn and soybeans.

#### Seed Certification and Field Inspection

A thorough discussion of seed certification was presented as it plays a vital role in the overall quality control system in seed programs. Techniques and procedures for field inspections were presented and evaluated. It was stressed that certification is an educational program and not a

strict "policing" and control action. Classes of certified seed and field and laboratory standards for certification systems were emphasized.

#### Seed Harvesting and Threshing

The importance of timely harvesting was stressed as a technique to minimize seed deterioration and field losses. The problems of mechanical damage, weed contamination and mechanical mixing seeds during harvesting and threshing was discussed.

#### Seed Drying and Storage

Principles and methods of drying and storage were of considerable interest. Factors affecting the viability of seed during drying and storage were stressed.

#### Seed Processing

The basic principles of seed separations were emphasized, and colored slides illustrated machines available for quality control. Practical exercises were not included during the processing topics since equipment was not available for demonstrations and practical work.

#### Course Evaluation

Twenty five participants from various segments of the Ecuadorian seed program completed the course requirements. These technicians presented themselves in a very professional manner and appeared to gain valuable information from the program. The participants are to be commended for their attention, promptness and interest as demonstrated by their many and thoughtful questions and comments.

Two examinations were utilized as one method in evaluating each participant's understanding of the course material. Results from these evaluations proved satisfactory in most cases which seemed to indicate a rather broad and general understanding of all concepts and materials presented.

The participants are commended for their grasp of this relatively new and detailed information in seed technology.

#### Recommendations

Ecuador has been struggling with the development of an effective and efficient seed program for a number of years. This is evident from the fact that seven training programs have been presented since 1969. The interest and determination to establish an effective seed program is still quite strong in Ecuador, and considerable improvements are evident. The formation of the mixed seed company, EM Semillas, and its continued development offers strong evidence of seed program development. Recent developments involving loans from AID and IBRD will result in the construction of seed laboratories and processing units. Even though slowly, the groundwork for seed program development is gradually being laid.

To assist in more rapid and effective development, Ecuador should consider the following recommendations:

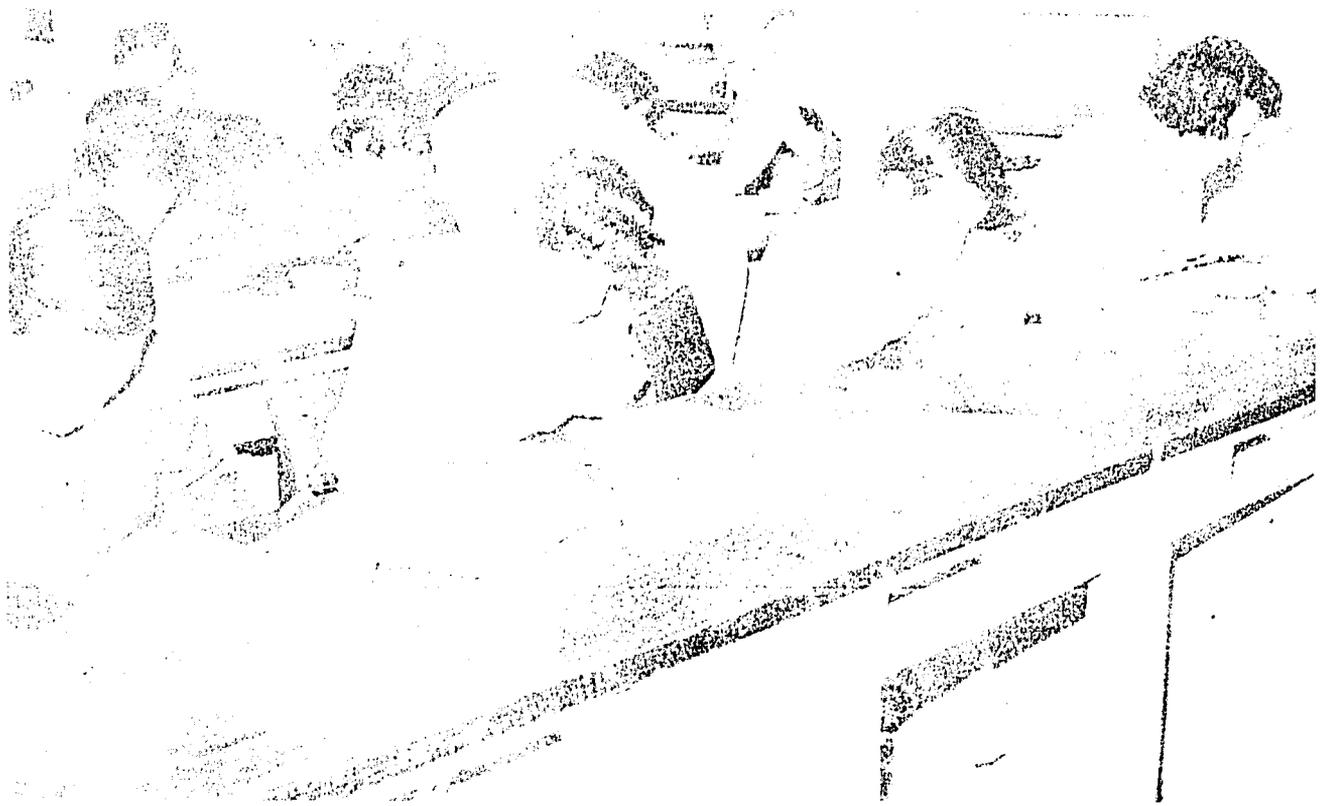
1. EM Semillas and/or the MAG should continue to concentrate on in-country training programs in all phases of seed technology.
2. Ecuador should stabilize the essential seed positions in the various agencies and sectors of the country. This will ensure that the trained technicians will remain in these positions thus reducing the necessity for continued wide-spread training of new technicians.
3. Ecuador should select technicians for advanced degree training in the U.S. or some other country (Brazil), in order to build up their core of trained personnel.
4. Ecuador should contact CIAT, Colombia to investigate the possibility of cooperative training programs.



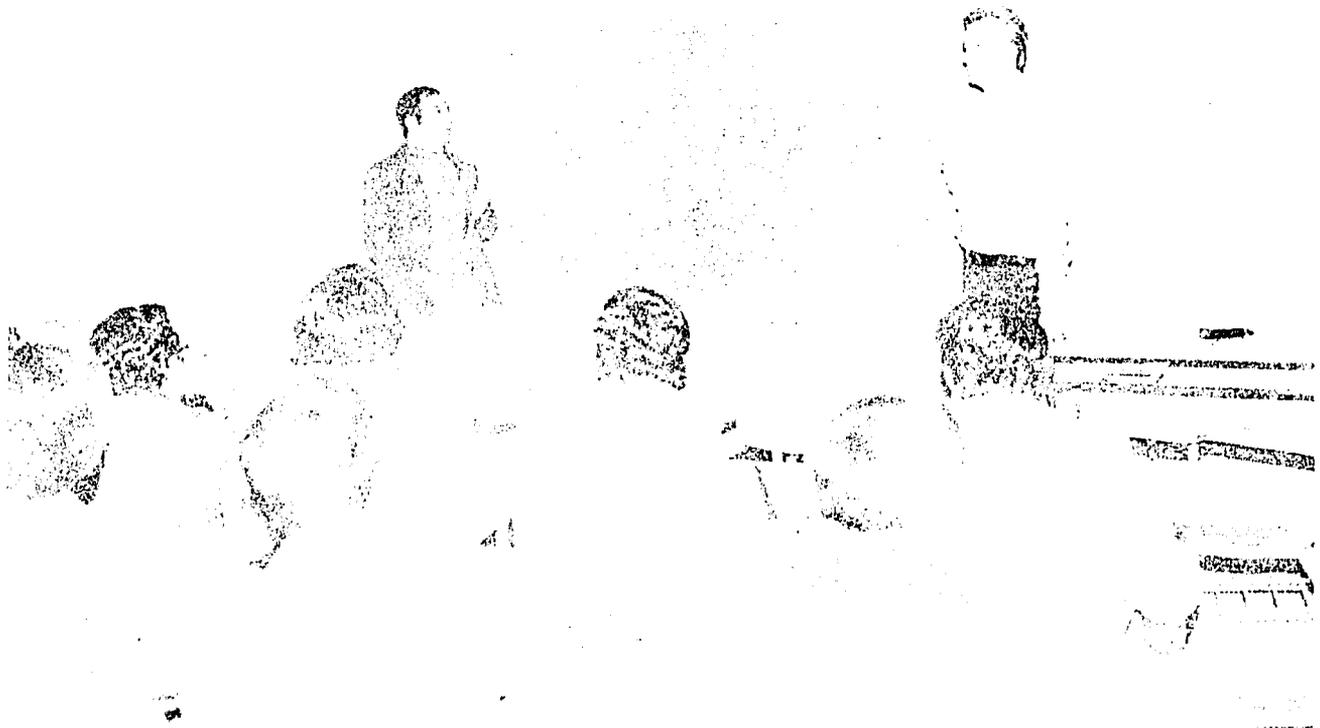
Drs. Vaughn and Andrews discuss techniques and procedures for purity analysis of corn.



Dr. Vaughn illustrates procedures for identifying components of the purity analysis.



Dr. Andrews assists participants in identifying components of purity analysis exercise.



Dr. Andrews, with Ing. Gomes as translator, discusses techniques and procedures for field inspection.

APPENDIX A  
LIST OF PARTICIPANTS

<u>Name</u>		<u>Address</u>
Ing. Marcelo Acosta P.	M.A.G.	Ibarra
Ing. Julio Salazar C.	M.A.G.	Portoviejo
Ing. Freddy Garcia M.	M.A.G.	Quito
Ing. Dimas Vera D.	M.A.G.	Quito
Ing. Jose V. Cevallos	M.A.G.	Portoviejo
Ing. Marcelo Ortiz T.	M.A.G.	Guayaquil
Ing. Galo Joaquin Bruque	M.A.G.	Ambato
Ing. Eduardo Vera	I.N.I.A.P.	Quevedo
Egdo. Julio Villavicencio	I.N.I.A.P.	Portoviejo
Ing. Ivan Ibarra R.	M.A.G.	Quito
Egdo. Mario Sanchez	I.N.I.A.P.	Quito
Ing. Alfredo Donoso	M.A.G.	Quito
Ing. Edgar Villena Chavez	M.A.G.	Cuenca
Ing. Alba Salvatierra M.	M.A.G.	Quito
Ing. Edwin Andramune D.	M.A.G.	Alausi
Agr. German Lopez	M.A.G.	Quito
Ing. Patricio Salguero	M.A.G.	Quito
Ing. Carmen Almeida	P.N.A.	Guayaquil
Ing. Arturo Jijon V.	M.A.G.	Guayaquil
Egdo. Jorge A. Cando Ch.	E.S.PO.CH.	Riobamba
Ing. Jose Altamirano Y.	E.S.PO.CH.	Riobamba
Egdo. Carlos R. Terreros	E.S.PO.CH.	Riobamba
Egdo. Fausto Sanaguano S.	E.S.PO.CH.	Riobamba
Ing. Julio Torres V.	M.A.G.	Riobamba
Ing. Eduardo Mayacela L.	M.A.G.	Quito

## APPENDIX B

## COURSE OUTLINE

Intensive Course for Postgraduate Training in  
Seed Production, Certification and Quality  
Evaluation in Ecuador

May 4	AM	(1) Introduction and orientation of MSU staff	Drs. Andrews & Vaughan
		(2) Objectives & requisites of a comprehensive seed program	Dr. Vaughan
	PM	(1) Seed development & maturation	Dr. Andrews
		(2) Morphology of seeds & seedlings	Dr. Vaughan
May 5	AM	(1) Purity analysis of seed	Dr. Vaughan
		(2) Practice in purity analysis	Dr. Vaughan
	PM	(1) Testing seed for germination	Dr. Andrews
		(2) Practice in germination testing	Dr. Andrews
May 6		Special exercise and/or field tour	
May 7		Sunday Holiday	
May 8	AM	(1) Maintenance of varieties, breeder seed production foundation seed production	Dr. Vaughan
		(2) Field inspection procedures	Dr. Andrews
	PM	(1) Practice in purity analysis	Dr. Vaughan
		(2) Germination testing	Dr. Andrews
May 9	AM	(1) Seed certification	Dr. Andrews
		(2) Seed certification procedures	Dr. Andrews
	PM	(1) Germination interpretation	Dr. Vaughan
		(2) Practice in germination interpretation	Dr. Vaughan
May 10	AM	(1) Seed harvesting & threshing	Dr. Andrews
		(2) Seed drying	Dr. Vaughan
	PM	(1) Seed storage	Dr. Vaughan
		(2) Seed storage	Dr. Vaughan
May 11	AM	(1) Principles of seed processing	Dr. Andrews
		(2) Seed processing equipment	Dr. Andrews
	PM	(1) Seed treating & packaging	Dr. Andrews
		(2) Seed handling & conveying	Dr. Vaughan
May 12	AM	(1) Seed Dormancy	Dr. Vaughan
		(2) Causes and consequences of seed deterioration	Dr. Andrews

	PM	(1) Germination interpretation (2) Germination interpretation	Dr. Vaughan Dr. Andrews
May 13		Special exercise and/or field tour	
May 14		Sunday Holiday	
May 15	AM	(1) Vigor testing (2) Tetrazolium testing	Dr. Vaughan Dr. Vaughan
	PM	(1) Germination interpretation (2) Preparation of seed for TZ staining	Dr. Andrews Dr. Andrews
May 16	AM	(1) Stain seeds with TZ (2) Effects of seed quality on plant performance	Dr. Vaughan Dr. Andrews
	PM	(1) Tetrazolium interpretation (2) Practical TZ interpretation	Dr. Vaughan Dr. Andrews
May 17	AM	(1) Quality control in seed production and seed programs (2) Advances in seed technology	Dr. Vaughan Dr. Andrews
	PM	(1) Discussion (2) Evaluation and review	Drs. Andrews, Vaughan Drs. Andrews, Vaughan