AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

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Batch #28

1. SUBJECT CLASSIFICATION

A. PRIMARY
Agriculture AC00-0000-G520

B. SECONDARY
Education,extension,and advisory work--Ecuador

2. TITLE AND SUBTITLE
Seed production and technology training course,report

3. AUTHOR(S)
Potts,H.C.; Andrews,C.H.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1976	17p.	ARC .C631.521.P8716

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Miss. State

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

9. ABSTRACT

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAB-711	
12. DESCRIPTORS	**13. PROJECT NUMBER**
Ecuador Seed production	**14. CONTRACT NUMBER** AID/ta-C-1219 GTS
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

USAID/ECUADOR

TA-76-1

AID/W

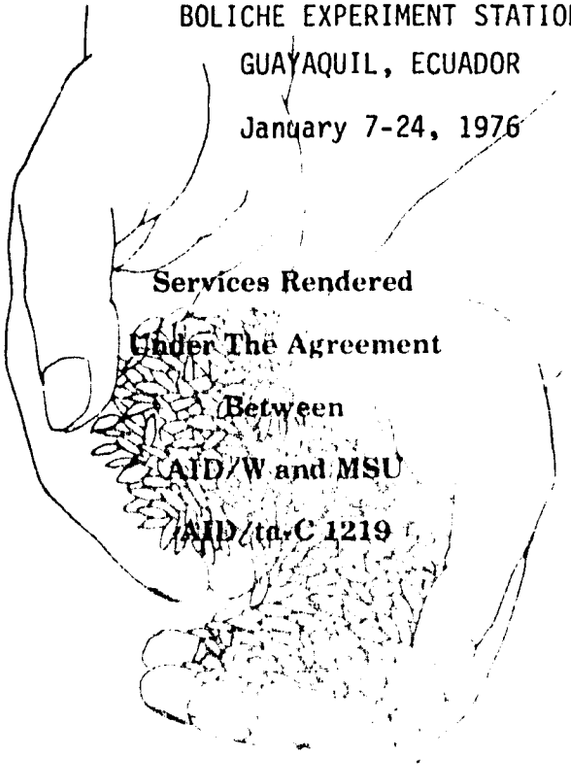
INIAP & MAG/GOE

SEED PRODUCTION AND TECHNOLOGY TRAINING COURSE

BOLICHE EXPERIMENT STATION

GUAYAQUIL, ECUADOR

January 7-24, 1976



Services Rendered

Under The Agreement

Between

AID/W and MSU

AID/ta-C 1219

SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

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REPORT SUMMARY

TITLE:	Seed Production and Technology Training Course
CONTRACT:	AID/ta-C-1219 with Mississippi State University
CONSULTANTS:	Howard C. Potts and C. Hunter Andrews, Seed Technology Laboratory, MAFES, Mississippi State, MS
PERIOD OF CONSULTATION:	January 7-24, 1976

SUMMARY

The USAID/E requested and the Project Manager approved the services of two senior seed technologists from MSU's Seed Technology Laboratory to prepare and present a training course on seed production and technology in cooperation with the cognizant Ecuadorian organizations. Drs. C.Hunter Andrews and Howard C. Potts were nominated by the contractor. The consultants departed their home station on January 7 and returned January 24.

The course was presented to 30 Ecuadorian technicians who had been selected from eight organizations and/or programs. Twenty-seven of the participants were certified as having passed the course requirements. Eighteen of the participants are currently working in seed production, processing or marketing and they should be able to apply the information learned immediately.

In addition to teaching the training course the consultants assisted the RDO by examining and approving the available preliminary engineering drawings of the proposed seed drying-processing-storage facility to be constructed with funds from USAID loan 518-L-033 by the PDDA (Diversification Program). Several suggestions for employee training and consultant assistance were given to the Executive Director of the PDDA.

The specific recommendations are as follows:

1. That a second course, similar in content to the one completed, be presented to the Ecuadorian technicians who work in the highland region, May 10-21, 1976.

2. That every effort be made to secure the services of interpretors with an excellent command of the Spanish language, particularly those technical terms commonly used in general botanical and engineering discussions. Professional or semi-professional services are recommended.

3. That the person or persons soliciting participants for the second course place a greater emphasis upon the course objectives and content.

4. That the Directors of the various institutions and programs which sponsored participants to this course make every effort to place those certified graduates in positions which will permit them to utilize their training.

5. That the Sub-secretary/MAG, Director of the Agriculture Development Division/ MAG and the Director of INIAP assert their leadership toward unifying the seed activities of the various Production Programs, thereby, eliminating many current duplicative activities and concentrating the personnel trained in seed technology into more effective operational groups.

6. That the INIAP, DCS/MAG coordinators, USAID/E-RDO and MSU consultants be responsible for providing the supplies and equipment listed in Appendix III for the recommended second course.

ACKNOWLEDGEMENTS

The Consultants are grateful for the support and assistance provided by the USAID/Ecuador Mission, especially Mr. Allen Hankins, RDO, and the National Agricultural Research Institute - INIAP - Dr. Enrique Ampuero, Director. Ing. Jorge Matamores, Ing. Fausto Cevallos and Ing. Edwardo Jarian (INIAP) were helpful in providing transportation and other logistical support, while Ing. C. Barba (DCS/MAG) and J. Cabrera (INIAP) presented program discussions. In addition, Ing. J. Flores and Ing. Orellana provided detailed discussions on seed commercialization by the Empressa Mixta de la Semillas (EMS). Ing. S. Balarezo and Ing. C. Alvarado (INIAP) were helpful with processing demonstrations.

We are especially grateful to Ms. Andrea Langley, Mr. Billy Gills and "Briggi" of the Peace Corps who served as translators during the course.

Howard C. Potts
Agronomist
Mississippi State University

C. Hunter Andrews
Associate Agronomist
Mississippi State University

REPORT TO
USAID/E, AID/W AND MAG/GOE
ON THE
SEED PRODUCTION AND TECHNOLOGY TRAINING COURSE

January 7-24, 1976

TERMS OF REFERENCE

USAID/Ecuador (Mr. Allen Hankins - RDO) requested the services of two consultants from the MSU/AID contract AID/ta-C-1219 for the purpose of presenting a Seed Production and Technology Training Course at the Boliche Experiment Station, January 7-24, 1976. Dr. Earl Leng, Project Manager, ta/AGR - AID/W approved the Mission request.

Drs. H.C. Potts and C.H. Andrews were nominated by the contractor to provide the technical assistance required. They departed from their duty station January 7. The training course was presented to 30 technicians representing primarily the Coastal regions of Ecuador from January 12-23. The consultants departed Ecuador on January 24.

BACKGROUND

During October - November, 1975, USAID/E requested and received technical assistance from the MSU/AID/W contract AID/ta-C-1219 in the review of Ecuador's seed program particularly as it affected the implementation of the PDDA funded by USAID loan 518-L-033, and in view of the initiation of a Seed Production and Distribution Project funded by the World Bank. Among the recommendations made in the report covering this assignment (MSU TA 75-18) was; "The MAG, INIAP, EM semillas and USAID/E organize and sponsor two, short-term, in-country training courses in seed production and technology to be presented during the first six months of 1976". The course covered by this report was the first of the two courses recommended.

In addition to the training course, the consultants were requested by the RDO-USAID/E to meet with representatives of the engineering company CIBO PRO AGRO, which is under contract to design a seed drying-processing-storage facility for use by the PDDA, and the Executive Director of the PDDA to review the preliminary engineering drawing for this facility. These meetings were follow-up to the October - November consultant services.

IMPLEMENTATION

1. Training Course

Prior to their departure, the consultants selected a series of handouts and related materials which were sent to Ecuador for translation into Spanish. Translations were made by the USAID/E translation unit and subsequently reproduced and bound by INIAP into a 240 page book, "Curso sobre Produccion y Tecnologia de Semillas." Each participant was supplied a copy of this book.

In addition to the book, INIAP, MAG and MSU personnel arranged for the supplies and materials, listed in Appendix III. These supplies will be needed

for the second course tentatively scheduled for May, 1976 at the Santa Catalina Experiment Station.

Classes were scheduled from 8 a.m. to 4 p.m. daily with the lunch period being 12:30 to 1:30. The off-hour lunch period worked well since it permitted most of the INIAP personnel an opportunity to finish lunch before the participants arrived. On the other hand, class rarely started before 8:30 a.m. because of the one hour drive from Guayaquil. The classroom facilities and training aids supplied by the INIAP Station were excellent.

Course instruction was presented in English, except for the six hours presented by Ecuadorian personnel. Two Peace Corps volunteers were utilized as interpreters the first week and much time was lost in familiarizing these most cooperative individuals with technical terms. A third Peace Corps worker, an Ecuadorian, replaced one of those who worked the first week and the rate of translation was accelerated somewhat. Except during the practical exercises translation the final three days was done by an Ecuadorian trained in Seed Technology, which permitted each instructor to cover about 50% more material in a lecture period. The participants' interest and comprehension increased noticeably during the final three days.

Course Objectives and Subject Matter

The objectives of this course were given to the participants during the introductory lecture and were as follows:

(a) To instill in each participant an appreciation of the difference between seed and grain and the importance of making this distinction.

(b) To make each student aware of the characteristics of the seeds of maize, soybeans, rice, and cotton and the techniques for evaluating the quality of these seed.

(c) To develop an awareness of the biological, physical and chemical properties of seeds and how these properties influence or are influenced by the methods used for production, drying, cleaning and storage.

(d) To familiarize the students with the most important techniques and equipment used in a modern, comprehensive seed program.

Major emphasis during the course was placed upon seed programs, seed maturation, quality evaluation, drying, storage and processing. Individual lectures on the INIAP Basic Seed Program, the MAG Seed Certification Program and Commercialization of a seed by the EM semillas were presented by the Ecuadorians responsible for these activities. Because of time limitations and the technology existing in Ecuador no specific time was devoted to seed production, harvesting practices or seed legislation. The detailed schedule for the complete course appears as Appendix I.

Course Evaluation

It is the opinion of the consultants that the objectives of the course

were satisfactorily attained by at least 90% of the participants. This is a satisfactory percentage in view of the method used for assigning the participants, several of whom are not involved in seed activities in their daily work.

The apparent interest of the students was directly related to the effectiveness of the translation particularly during those lectures where slides were used. The generally enthusiastic and energetic participation of the students during the practical exercises, particularly during the second week, indicated that the participants had gained a basic understanding of the important points of emphasis. It also served to re-emphasize the fact that practical exercises are of little value until the students understand the practical theory on which such exercises are based.

Of the thirty participants (Appendix II) slightly over one-half are currently involved in seed activities; production, testing, processing or commercialization. The others were drawn from programs the success of which are influenced by the availability of good seed. However, without exception it is believed that every participant experienced a vast expansion in his or her knowledge concerning seed and its role in accelerating the development of Ecuador's agricultural sector.

Recommendations

1. That a second course, similar in content to the one completed, be presented to the Ecuadorian technicians who work in the highland region be presented May 10-21, 1976.

2. That every effort be made to secure the services of interpretors with an excellent command of the Spanish language, particularly those technical terms commonly used in general botanical and engineering discussions. Professional or semi-professional services are recommended.

3. That the person or persons soliciting participants for the second course place a greater emphasis upon the course objectives and content.

4. That the Directors of the various institutions and programs which sponsored participants to this course make every effort to place those certified graduates in positions which will permit them to utilize their training.

5. That the Sub-secretary/MAG, Director of the Agriculture Development Division/MAG and the Director of INIAP assert their leadership toward unifying the seed activities of the various Production Programs, thereby, eliminating many current duplicative activities and concentrating the personnel trained in seed technology.

6. That the INIAP, DCS/MAG coordinators, USAID/E-RDO and MSU consultants be responsible for providing the supplies and equipment listed in Appendix III for the next course.

II. PDDA Processing Facility

The consultants met with USAID/E, PDDA and CIBA PRO AGRO personnel on several occasions during their stay in Ecuador. The preliminary engineering drawings of the floor plan were examined and were believed to be very functional. Basically, the plans viewed were duplicates of plans, submitted by MSU to CIBO PRO AGRO in

November, 1975, of operational units already in operation in other countries.

During the final discussion with the PDDA Director, he indicated that the complete set of preliminary drawings and the equipment specifications were to be completed by March. The Director requested that a Seed Processing Engineer from MSU be sent to Ecuador to review this material when it is completed. He was informed that a qualified engineer could be made available on short notice by MSU for a period of 3-4 days but that the request for such services should be submitted to the RDO, USAID/E.

One meeting was devoted almost exclusively to the advantages and disadvantages of locating the PDDA facility near Portoveijo as opposed to various alternate sites. Essentially all technical considerations indicate that Portoveijo is the most suitable site. On the other hand, there appear to be valid concerns about the physical and fiscal management of the facility if it is not located in the general vicinity of the Guayaquil headquarters of the PDDA. As of January 24, no decision had been made concerning the building site.

The need for additional technical training of those technicians who will be responsible for operation of the facility was also discussed. It was generally agreed that, if their English language permitted that either 2 or 3 PDDA technicians would be sent to the USA for 13 weeks to participate in the AID/W Seed Improvement Training Course (130-3) May - August , 1976. One of the selected participants would remain in the U.S. until December to permit him to receive in-depth training in seed production, seed analysis, seed processing machinery, and management principles at MSU. Additionally, if the necessary arrangements can be made the PDDA Director will spend one week at MSU, as part of a longer program, to familiarize him with the University's training facilities and to observe operation of commercial processing facilities similar to those planned for Ecuador.

APPENDIX I

COURSE OUTLINE

SEED PRODUCTION AND TECHNOLOGY TRAINING COURSE

BOLICHE EXPERIMENT STATION - INIAP
January 12-23, 1976

Jan. 12 - Monday		
8:30	Registration and Orientation	Ing. F. Cevallos
10:00	General Disposition and Organization of Course	Ing. J. Matamoros
10:30	Objectives and Requisites for a Comprehensive Seed Program	Dr. H.C. Potts
1:00	Lunch	
2:00	Seed Development and Maturation	Dr. C.H. Andrews
3:00	Morphology of Seeds and Plants	Dr. H.C. Potts
Jan. 13 - Tuesday		
8:00	Seed Certification - Objectives, Procedures and Organization	Ing. Barba
9:00	Purity Analysis - Introduction, Objectives, Procedures, Equipment	Dr. C.H. Andrews
10:00	Coffee	
10:30	Dividing and Sampling Seed Lots	Dr. H.C. Potts
12:30	Lunch	
1:30	Seed Moisture Determination	Dr. H.C. Potts
Jan. 14 - Wednesday		
8:00	Production of Breeder and Foundation Seed for INIAP	Ing. Cabrera
10:00	Coffee	
10:30	Purity Analysis of Rice and Soybeans	Dr. C.H. Andrews
12:30	Lunch	
1:30	Introduction to Germination Testing	Dr. H.C. Potts

2:30	Germination Test of Rice and Soybeans	Dr. H.C. Potts

Jan. 15 - Thursday

8:00	Principles of Seed Drying	Dr. H.C. Potts
10:00	Coffee	
10:30	Transporting and Handling Seed and Causes of Mechanical Damage	Dr. C.H. Andrews
12:30	Lunch	
1:30	Components, Operation and Management of Seed Drying Systems	Dr. H.C. Potts
3:00	Problems in Seed Drying	Dr. H.C. Potts

Jan. 16 - Friday

8:00	Principles of Seed Processing	Dr. C.H. Andrews
10:00	Coffee	
10:30	Tour of Seed Processing Plant at Boliche Experiment Station	Ing. Balarezo
11:00	Basic Seed Cleaning	Dr. H.C. Potts
12:30	Lunch	
1:30	Air and Screen Cleaner	Dr. H.C. Potts
3:00	Soil Emergence Test of Rice and Soybeans	Dr. C.H. Andrews

Jan. 19 - Monday

8:00	Germination Test Evaluations 1st Count for Rice and Soybeans	Dr. C.H. Andrews
10:00	Coffee	
10:30	Spiral Separators	Dr. H.C. Potts
11:30	Specific Gravity Seed Separations	Dr. H.C. Potts
1:00	Lunch	
2:00	Operation of Air and Screen Machine and Gravity Table	Ing. Alvarado Dr. H.C. Potts Dr. C.H. Andrews

/

Jan. 20 - Tuesday

8:00	Dimensional Sizing of Seed - Length, Width and Thickness Separators	Dr. C.H. Andrews
10:00	Coffee	
10:30	Seed Treatment and Methods of Application	Dr. H.C. Potts
12:30	Lunch	
1:30	Concepts of Seed Storage	Dr. C.H. Andrews
3:00	Seed Packaging and Packaging Materials	Dr. H.C. Potts

Jan. 21 - Wednesday

8:00	Causes and Consequences of Seed Deterioration	Dr. C.H. Andrews
10:00	Coffee	
10:30	Design and Management of Seed Storage Facilities	Dr. H.C. Potts
12:30	Lunch	
1:30	Germination Evaluation Final Count Rice and Soybeans	Dr. C.H. Andrews
3:00	Introduction to Tetrazolium Testing	Dr. C.H. Andrews

Jan. 22 - Thursday

8:00	Tetrazolium Testing of Soybeans and Corn	Dr. C.H. Andrews
10:00	Coffee	
10:30	Commercialization of Seeds	Ing. Orellana Ing. Flores
12:30	Lunch	
1:30	Tetrazolium Evaluation of Soybeans and Corn	Dr. C.H. Andrews Dr. H.C. Potts
3:00	Soil Emergence Evaluation of Rice and Soybeans	Dr. C.H. Andrews Dr. H.C. Potts

Jan. 23 - Friday

8:00	Course Examination	Ing. Fausto Cevallos
10:00	Coffee	
10:30	Effect of Seed Quality on Plant Performance	Dr. C.H. Andrews
11:30	Summary and Discussion	Dr. H.C. Potts
12:30	Lunch	
1:30	Evaluation of Examination	Ing. Flores
3:00	Closing Ceremonies and Awards	Ing. Francisco Cevallos

APPENDIX II
LIST OF PARTICIPANTS[1/]

SEED PRODUCTION AND TECHNOLOGY TRAINING COURSE
BOLICHE EXPERIMENT STATION - INIAP

January 12-23, 1976

NAME	INSTITUTION
1. Ing. Carlos Jimenez	Minist. Agricultura y Ganaderia
2. Agr. Oscar Reza	Empresa Mixta de Semillas
3. Sr. Enrique Viteri	Empresa Mixta de Semillas
4. Ing. Carlos Cano	Prog. Desarrollo y Divers. Agric.
5. Ing. Hector Hidalgo	Banco Nacional de Fomento
6. Ing. Freddy Samaniego	Dpto. Certificacion de Semillas
7. Ing. Héctor Castro	Prog. Nacnl. de Arroz y Maiz.
8. Egdo. Victor Ortega	C E D E G E
9. Ing. Alfredo Romero	Prog. Desarrollo y Divers. Agric.
10. Egdo. Luis E. Vera	I N I A P
11. Agr. Enrique Cabezas	I N I A P
12. Ing. Jose Pilataxi	Minist. Agricultura y Ganaderia
13. Ing. Manuel Armijos	Empresa Mixta de Semillas
14. Ing. Felix Pazmino	Empresa Mixta de Semillas
15. Ing. Martha Cevallos	Minst. Agricultura y Ganaderia
16. Egdo. Maritza Cabello	Prog. Nacnl. de Arroz y Maiz
17. Ing. Jose Aulestia	Minst. Agricultura y Ganaderia
18. Ing. Juan A. Baez	Prog. Nacnl. de Arroz y Maiz
19. Ing. Gerardo Suing	Prog. Desarrollo y Divers. Agric.
20. Ing. Luis A. Jijón	Minst. Agricultura y Ganaderia
21. Ing. Freddy Quimi	I N I A P
22. Ing. Sergio Balarezo	I N I A P
23. Ing. Néstor López	Prog. Desarrollo y Divers. Agric.
24. Ing. Alfredo Cassis	Prog. Desarrollo y Divers. Agric.
25. Egdo. Gabriel Zapata	Banco Nacional de Fomento
26. Agron. Dimas Olvera	I N I A P
27. Ing. Nestor Medrano	I N I A P
28. Ing. Edgar Villena	Minist. Agricultura y Ganaderia
29. Agron. Jorge Torres	C E S A
30. Ing. Alberto Camchong	C E S A

[1/] Twenty seven of the thirty participants were certified as having successfully passed the final examination by the Examining Committee.

APPENDIX III

SUPPLIES AND EQUIPMENT NEEDED FOR THE SECOND COURSE ON SEED PRODUCTION AND TECHNOLOGY
(Based upon 30 participants)

ITEM	NUMBER OR QUANTITY	RESPONSIBILITY
1. Processed, untreated seed of Maize, Wheat	60kgs. ea.	INIAP
2. Clean seed-ryegrass or tall fescue	1kg	"
3. Electric moisture testors	3	"
4. Torsion balances	4	"
5. Gram scales (500 gram capacity)	4	"
6. Seed dividers	2	"
7. Germination paper	500 sheets	"
8. Petri dishes	60	"
9. 10 liter buckets	4	"
10. Incubator or oven set at 35oC (access only)	1	"
11. Seed bags (new) paper, jute, woven plastic	1 ea.	"
12. Germinator (200 roll, minimum capacity)	1	"
13. 100ml plastic or paper cups	90	"
14. Record forms for purity & germination	100	"
15. Seed probes ½ in. dia., 1 in. dia., and one with divisions	1 ea.	"
16. Wax pencils	6	"
17. Trays or boxes for soil test of seed 50x50x10cm	15	"
18. Folders for course notes	30	"
19. Book-"Curo sobre Produccion y Tecnologia de Semillas"	30	"
20. Rubber Bands	150	"
21. Paper Clips	100	"
22. Filter paper for petri dishes	200 sheets	"
23. 50 ml glass or plastic beakers	60	"
24. 2 kg. paper bags	60	"
25. Maiz-unshelled	5-8qq	"
26. Wheat-uncleaned	5-8qq	"
27. "Prueba de Viabilidad de la Semilla con Tetrazol" por Delouche, Still, Raspet y Lienhard. (Distributed through USAID Missions in Central and South America). Available from: Ms. Marjorie Bowes, Regional Technical Aids Center, Department of State - AID, c/o American Embassy, Mexico DF	30	USAID/E
28. Indelible pencils	10	MSU
29. Coin Envelopes	250	"
30. Tetrazolium chloride	50gm	"
31. Single edge razor blades	30	"
32. Magnifying glass	30	"

33. Germinating blotting paper (6"x16")	120 sheets	MSU
34. Potassium nitrate	10 gm	"
35. Forceps (style qq)	30	"

The classroom at Santa Catalina is fully equipped for instruction and most of the practical work. It is suggested that the necessary arrangements be made with the Station Director and Food Service Supervisor to permit the scheduling of classes and breaks as follows:

8:30 a.m. - 10:00 a.m.	Class Period	
10:00 a.m. - 10:30 a.m.	Coffee	
10:30 a.m. - 12:30 a.m.	Class Period	
12:30 p.m. - 1:30 p.m.	Lunch	
1:30 p.m. - 4:00 p.m.	Class period	(15 min. coffee break about 2:45 p.m.)