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9. ABSTRACT

Summarizes the findings and recommendations of a consultant from the Mississippi State University Seed Technology Laboratory (MSU/STL) concerning seed production in Panama. At the request of USAID/Panama, MSU/STL assisted the government of Panama in its developing seed program on several occasions. It participated in design and installation of equipment at Divisa and Alanje. These government seed plants have been recently reorganized into the Empressa Nacional de Semillas (ENASEM), and recommendations were requested for improvement of the seed program and facilities. Observations of seeds in storage were primarily conducted on rice but some corn, bean, sorghum and cowpea seeds were also studied. Some problems and restraints to the program included: poor germination and deterioration of seeds in storage; varietal mixtures in rice from 2% to more than 20%; non-availability of varieties for production at high levels of technical inputs; lack of structure and personnel for certification program; lack of acceptance of ENASEM seed at a price that would allow adequate return on current resources budgeted; maintenance and operational problems with conditioned storage, processing equipment and vehicles; and a need for technical training in seeds and seed program development. Specific recommendations are made for each of these deficiencies by the consultant.

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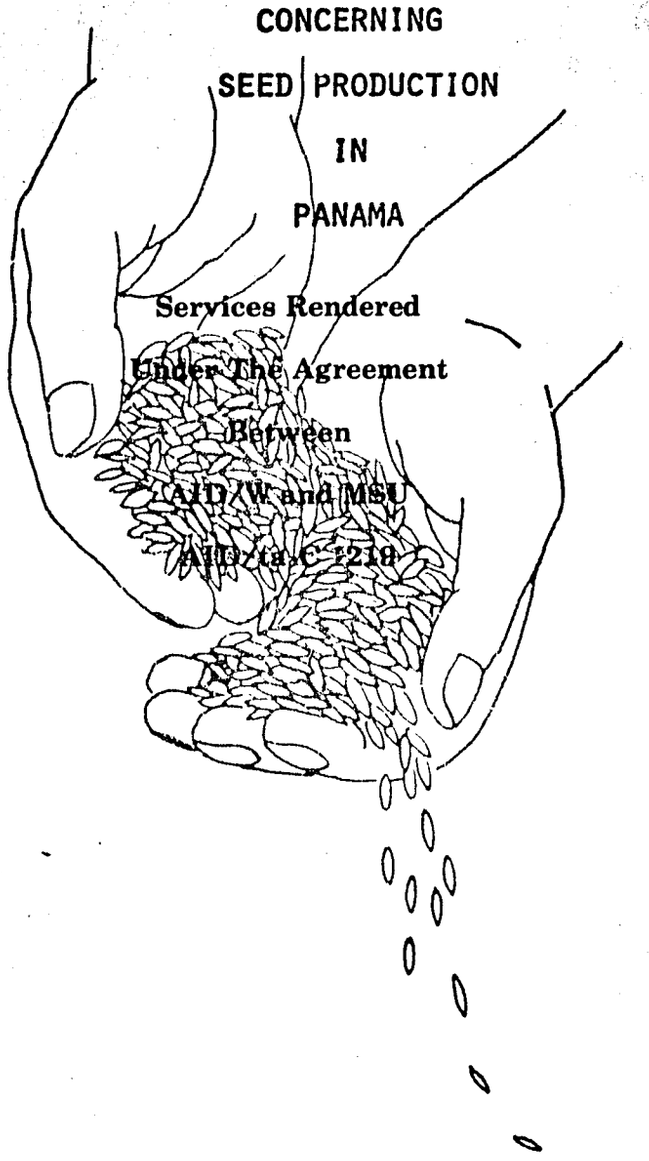
TA 77-4

CONSULTING VISIT CONCERNING SEED PRODUCTION IN PANAMA



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SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

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Report Summary

TITLE: Report to USAID/Panama and Government of Panama on Consulting Visit Concerning Seed Production in Panama.

CONTRACT: MSU/AID ta-C-1219

AUTHOR: A.H. Boyd, Associate Agronomist
Seed Technology Laboratory
MAFES
Mississippi State University

PERIOD: 17 May - 4 June 1977

REPORT NO.: TA 77-4

SUMMARY

A. This consultant was requested by USAID/Panama to assist GOP in their seed improvement program.

B. Recommendations from previous visits as to repair of elevator heads and spouting had been accomplished at Divisa. Bodegas and laboratory at Divisa were clean and insects apparently under control. Engineer Urena is to be complemented for improvement in a location that has been poorly managed in the past. The bodegas at Panama have been repaired and storage conditions improved. New discs for the Carter-Day disc separator have been obtained and installed at Alanje.

C. Problems and Restraints to the program observed.

1. Poor germination of seeds and deterioration of seeds in storage.
2. Varietal mixtures in rice from 2% to more than 20%.
3. Non availability of varieties for production at high levels of technical imputs.
4. Structure and personnel for certification program are not available.
5. Lack of acceptance of ENASEM seed at a price that will allow adequate return on current resources budgeted.

6. Maintenance and operational problems with conditioned storage, processing equipment and vehicles.
7. High overhead in relation to expected production and demand.
8. Need for technical training in seeds and seed program development.

D. Recommended action or programs for relief of observed problems.

1.a. Attention to harvest and drying procedures, place harvested and dried seed in conditioned storage as quickly as possible - preferably within a few days of drying.

b. Repair all existing mechanical equipment in conditioned warehouses and replace non-serviceable or missing equipment so that proper conditions can be maintained.

c. Operate all conditioned warehouses so that temperatures no higher than 70°F and relative humidity of between 50 and 55% is maintained during the storage period.

d. Attend to cleanliness and sanitation of plant and warehouse space to minimize re-infestation of insects after fumigation.

2. Develop a foundation seed project at Tocumen to be operated by University of Panama, Department of Agronomy.

3. Review all available research information and re-evaluate recommendations for varieties in view of all aspects of Panama agriculture. Varieties must be available for all technical levels of production and there must be adequate educational effort to inform the producers of the cultural requirements as well as the production potential of the variety.

4. Problems of acceptance are related to problems 1, 2 and 3 especially in the case of rice.

To gain acceptance by the producers ENASEM must:

a. Obtain basic seed stocks which can be increased at certified existing standards.

b. Keep new varieties in the supply system that are better than existing varieties.

c. Process and maintain the seeds so that mechanical and physiological quality is high at time of delivery.

d. Assure that seed of high quality, of the needed variety is available at the proper location (field) at the proper time.

5. Maintenance of all mechanical equipment must be improved. The major deficiencies appear to be caused by inability to obtain parts which must be imported. A stock of the most commonly used spare parts is essential for a seed processing plant. Rice is the most abrasive of all crop seeds handled in Panama and creates a need for routine replacement of certain parts. Refrigeration equipment and dehumidifiers must be kept in operation or the seeds will deteriorate in storage.
Support of this activity in funds and supervision is essential to solution of many of the problems.

6. Overhead should be kept to a minimum by utilization of permanent staff to the maximum and prevention of proliferation of research type activities within ENASEM.

7. Quality control laboratories should be kept simple in line with the production mission of the empresa. Detailed seed pathology research and service should be the responsibility of the University of Panama or IDIAP who should in turn provide ENASEM advice on specific problems.

8. Better technical training at all levels of management and quality

control will allow the people to function more efficiently and assist in solving their own problems.

The following training programs are recommended:

a. Gladys Escala de Famigleitti - M.S. Agricultural Economics with minor in seed technology.

b. Agronomo Leonidas Urena, Jorge Ceballos and two others to be selected - 3 month seed improvement training course for foreign students sponsored by USAID at Mississippi State University.

   Note: Understanding of English necessary.

c. For longer range needs, two people should be selected for Master of Science level training in seed technology for furture manager and assistant for production and quality control.

d. IDIAP should send one participant for Master of Science training in seed technology and one technician to the University of Costa Rica seed laborator for on the job training.

e. University of Panama should send the manager of the Foundation Seed Program to MSU/STL for refresher training in seed program development, processing, etc.

10. Equipment should be replaced as funds are available in the priority order (1) dehumidifiers (2) air conditioners (3) air screen cleaner at Alanje (4) gravity table at Divisa.

Acknowledgements

I wish to express my personal appreciation to the staff at USAID/Panama and especially to Mr. Ray White for assistance while I was in Panama. Special thanks also are due to Lic Carlos Bartley, Ing. Gabriel Dispaigne and Lic. Gladys de Famiglietti for their conferences and supply of information. All the staff at ENASEM and the University of Panama were most cordial and it was a pleasure to work with them.

A.H. Boyd
Associate Agronomist

Report to USAID/Panama and Government of Panama
on
Consulting Visit Concerning
Seed Production in Panama

17 May - 4 June 1977

A.H. Boyd

Introduction

At the request of USAID/Panama the Seed Technology Laboratory at Mississippi State University (MSU/STL) has assisted the government of Panama (GOP) in its developing seed program on several occasions. Members of the MSU/STL staff assisted in design and installation of equipment at Divisa and Alanje. This consultant made brief visits to the seed program in 1973 and 1975. Details of these visits are covered in reports MSU/USAID TA 73-6 and MSU/USAID TA 75-16. Some parts of these reports are attached as appendices to this report for reference.

The government seed plants have been recently reorganized into the Empressa Nacional de Semillas (ENASEM). The management of ENASEM requested the assistance of MSU/STL for recommendations for improvement of the seed program and facilities. Such recommendations cannot be realistic without taking in the effects of all phases of the program. Therefore, this report covers recommendations concerning policy as well as some specific and detailed operational suggestions.

General Observations

Problems and restraints to the seed program

1. Observations of seeds in storage were primarily on rice but some corn, bean, sorghum and cowpea seeds were also in storage. There were problems with insect damage on cowpeas, particularly at Alanje. Records of germination tests over periods up to four months indicated a consistent

reduction of germination from 92-95% to 70-85%. While most of the seeds were still of high enough germination percentage to be used for planting seed, this indicated that there are quality problems that need correction.

Records of seed analysis reported a fairly consistent moisture content of 12.5-13.5%. This indicates that seed are held in conditions of 65-75% relative humidity (RH). Such conditions are not good for seed storage. In fact, at 75% RH storage fungi can grow. My assumption of high RH in storage facilities is borne out by a comment by Professora Blanca de Hernandez that she observed an increase in infestation of fungi on rice seeds in ENASEM storage.

2. Analysis reports indicated a range in varietal mixtures from 2-20% with Nilo varieties consistently showing the greatest contaminations. The mixture Nilo 1 X Nilo 2 is not as serious as some others could be since the two varieties are near the same height and maturity. However, differences are obvious in the field and serve to lower confidence in any other claimed attribute of the seed. Previous recommendations to tag only the highest quality seed with a "certified" tag had been implemented. Certified tags, are this season, placed on seed lots of 97% purity or better while lots from 97% down to 85% purity are labeled "selected seed". This is adequate progress until better basic seed stocks are available but still fall far short of standards set by the seed law Decreto No. 132 (de 13 de Abril de 1967) which is reproduced (Appendix A) for reference.

3. High producing varieties which require higher levels of technical management are not receiving adequate emphasis from ENASEM. High yielding varieties such as CR-11-13 are being grown by private producers very

TABLE 1

INFORME FINAL SOBRE LA COSECHA Y PRODUCCION DE ARROZ
PRODUCTORES INDEPENDIENTES
(EN QQ)

PROVINCIA		VARIEDADES COSECHADAS	HECTAREAS COSECHADAS	R/HA EN QQ	VOLUMEN DE PRODUCCION
Chiriquí		CR-11-13	10,500	41	430,500
		CICA 6	5,300	36	190,800
		Apani	630	38	23,940
		Awini	420	40	16,800
		Nilo 1	4,150	33	136,950
	Sub-total		21,000	38.04	798,990
Veraguas		Nilo 1	237	40.06	9,495
		CR-11-13 y CICA 6	1,064.5	60.04	63,513.87
	Sub-total		1,301.5	56.42	73,408.87
Herrera		Nilo 1	190	25.31	4,809.05
	Sub-total		190	25.31	4,809.05
Coclé		Nilo 1			164,402.05
		Nilo 2			1,546
		Apani			5,395
		CICA 4			38.10
		CICA 6			33,984.9
		Bowani			5,918.4
		IR-8			3,423.1
		CR-11-13			384.3
	Sub-total		8,272	26.0	215,091.85
Capira		Nilo 1	32	48.28	1,545.16
		Nilo 2	41	23.48	962.69
	Sub-total		73	34.35	2,507.85
Chepo		Nilo 1	150	21.2	3,180.
		CICA 6	90	25.	2,250
	Sub-total		240	22.63	5,430
Los Santos		Nilo 1	274	40.81	11,182
	Sub-total		274	40.81	11,182
Bocas del Toro		CR-11-13	1,054	74.19	78,197
		CICA 6	292	76.83	22,434.36
		Nilo 2	93	37.73	3,471.16
		Linea 15	18	92	1,656
	Sub-total		1,456	72.63	105,758.52

Duente: Dirección Nacional de Producción

successfully. For example table 1 shows that in chiriqui 15,800 ha or about 75% of the rice production was CR-11-13 and CICA6 and only about 20% was Nilo 1. Nilo 1 produced only 80% as much as CR-11-13.

This is not to say that Nilo 1 and Nilo 2 should be abandoned. They apparently produce a reasonably shure crop on lands of medium fertility with equivalent technical inputs. However to stimulate higher production the better varieties must be utilized. In Central America higher yielding varieties have consistently been attacked by diseases after 2-5 years necessitating their replacement. Risks of such a situation must be accepted and an adequate system of rapid replacement of varieties as needed established.

A replacement system must first consist of research personnel to develop test and evaluate new lines to determine their potential for release in the country as new varieties. This is in existence at Univ. of Panama and under development at IDIAP. The second step is an organization to accept seed of new varieties and increase them under strict supervision to an adequate supply to insure an impact on agricultural production. After the initial increase is made the designated organization usually called a foundation seed organization maintains a continuing supply of pure stock to continue to supply high quality pure stocks into the production system until a new release is needed. A foundation seed organization does not exist at this time.

4. As a continuation of the system mentioned above a quality control system to assist producers in obtaining high quality seed on a high volume production basis is needed. A seed certification program can serve this purpose but is not now available. Seed certification is now the duty of IDIAP but there was no opportunity to disucss this with

the director of that organization.

It is apparently safe to assume that IDIAP does not have personnel trained for seed programs on seed certification. At present this is no great problem since seed certification is only needed after pure seed stocks are available. There is time (2 or 3 years) to develop this capability while a foundation seed organization is under development. A seed certification agency as is operated in the U.S., Canada and Europe is needed only if there is support of independent producers. Operations of ENASEM can be controlled by executive supervision.

Seed testing laboratories at each of the processing locations at ENASEM are adequate, with minor additions and replacement of equipment, for internal quality control and some service testing. A more complete laboratory to assist in certification, law enforcement, a general seed testing and seed pathology research should develop along the same time scheduled as the certification program.

5. A lack of acceptance of ENASEM seeds at a price level adequate for good returns was discussed with the staff. Acceptance problems are related to all the above problems. A seed company, whether private or governmental such as ENASEM, must justify its existence by performing a service that the farmer is technically incapable of or at a lower price than he can perform for himself. Seed quality of rice is physically better than the farmers can obtain without cleaning equipment but germination and purity are not enough better to command higher prices. Neither have there been newer and better varieties in the system.

It is a typical situation with self pollinated crops that the price of seeds tend to go higher than farmers will accept and they then save their own seed until they need a new variety or their seed become mixed.

TABLE 2

EMPRESA NACIONAL DE SEMILLAS

Dirección de Economía y Finanzas
Flujo de Requerimiento Financiero
(Inflación Cero)
Manteniendo los Precios Actuales
(En millones de Balboas)

	1975 1976	1976 1977	1977 1978	1978 1979	1979 1980
Total de Ingresos	1.635	1.429	1.516	1.372	1.093
Saldo de caja		(.162)	(.457)	(.775)	(1.110)
Ingresos corrientes	1.635	1.591	1.973	2.147	2.203
Venta total	1.133	1.281	1.860	2.032	2.086
Arroz	.673	.898	1.494	1.656	1.710
Maíz	.030	.007	.096	0.096	.096
Frijol	.080	.099	-	-	-
Poroto	.120	.150	.120	.120	.120
Sorgo	.115	.127	.150	.160	.160
Arroz comercial	.105	-	-		
Frijol comercial	.010	-	-		
Maiz comercial	.002	-	-		
Otros Ingresos	.400	.110	.113	.115	.117
Aporte Estatal	.100	.200	-		
Egresos corrientes	1.656	1.348	1.931	2.080	2.130
Compra total	1.388	.085	1.563	1.707	1.792
Arroz	1.014	.748	1.245	1.380	1.425
Maíz	.071	.005	.080	.080	.080
Frijol	.094	-	-		
Poroto	.100	.115	.100	.100	.100
Sorgo	.112	.117	.138	.147	.147
Adm. y Operación	.265	.363	.368	.373	.378
Exc. Bruto de Op.	(.021)	.081	(.415)	(.708)	(1.037)
Intereses	.141	.118	.095	.067	.030
Intereses de la deuda	.141	.118	.095	.067	.030
Cuenta de Capital		(.037)	(.510)	(.775)	(1.067)
Gasto de Capital		.170	.115	.035	.135
Inv. en Const. de Bodega		.080	.080		.100
" " Equipo de Proc.		.025	.025	.025	.025
" " " " Lab.		.015	.010	.010	.010
" " Const. de Regadio.		.050			
Amortización		.250	.150	.300	.300
Déficit o Superavit	(.162)	(.457)	(.775)	(1.110)	(1.472)

Nota: Se puede observar el incremento de las deudas cada año.

TABLE 3

EMPRESA NACIONAL DE SEMILLAS

Dirección de Economía y Finanzas
Flujo de Requerimiento Financiero
(Inflación Cero)
Incrementos en todos los Precios
(En millones de Balboas)

	1975 1976	1976 1977	1977 1978	1978 1979	1979m 1980	1980 1981
Total de Ingresos	1.635	1.487	1.960	2.215	2.342	2.353
Saldo de caja		(.162)	(.449)	(.414)	(.359)	(.348)
Ingresos corrientes	1.635	1.649	2.409	2.629	2.701	2.701
Venta total	1.133	1.539	2.296	2.514	2.584	2.584
Arroz	.673	1.147	1.909	2.116	2.185	2.185
Maiz	.030	.008	.115	.115	.115	.115
Frijol	.080	.104	-	-		
Poroto	.120	.153	.122	.123	.124	.125
Sorgo	.115	.127	.150	.160	.160	.160
Arroz comercial	.105					
Frijol "	.010					
Maíz "	.002					
Otros ingresos	.400	.110	.113	.115	.117	.117
Aporte estatal	.100					
Egresos corrientes	1.656	1.398	2.014	2.172	2.225	2.230
Compra total	1.388	1.035	1.646	1.799	1.847	1.847
Arroz	1.014	.798	1.328	1.472	1.520	1.520
Maíz	.071	.005	.080	.080	.080	.080
Frijol	.094	-				
Poroto	.100	.115	.100	.100	.100	.100
Sorgo	.112	.117	.138	.147	.147	.147
Admón y Operación	.265	.363	.368	.373	.378	.383
Exc. Bruto de Oper.	(.021)	.089	(.054)	.043	.117	.123
Intereses	.141	.118	.095	.067	.030	.006
Intereses de la deuda	.141	.118	.095	.067	.030	.006
Cuenta de capital		(.029)	(.149)	(.024)	.087	.117
Gasto de capital		.170	.115	.035	.135	.155
Inv. en construcción de bodegas.		.080	.080		.100	.100
Inv. en equipo de procesar.		.025	.025	.025	.025	.025
Inv. en equipo de Lab.		.015	.010	.010	.010	.030
" " construcción de regadío.		.050				
Amortización		.250	.150	.300	.300	.100
Déficit o Superavit	(.162)	(.449)	(.414)	(.359)	(.348)	(.138)

This is true in the U.S. where only slightly more than 2% of wheat production is planted to certified seed. The situation is quite different with hybrids since the farmer must return to the seedsman each year to obtain the benefits of the increased potential of the hybrid.

One important factor in acceptance is the variety. It was noted by Lic. Bartley that at the time ENASEM was selling cleaned seed at B 18/qq private producers were selling uncleaned seed at B23/qq. Therefore, it is obvious that price is the only constraint to seed sales.

6. Maintenance of equipment, facilities, and vehicles continue to be a problem with the program. Very good progress has been made in this category since my last visit except where special parts must be imported. A list of suggested repair parts to be ordered and stocked for the air screen cleaners and suggestions for a maintenance routine and are placed in Appendix B for reference. Repair parts are a continuing problem in which higher management should assist ENASEM in establishing an administrative way for expediting movement of orders and receiving procedures.

Seed treaters at Alanje, Divisa and Panama need repair. Recommendations were made for each individual machine and parts lists for the two Gustafson machines were forwarded to ENASEM.

Air conditioners are in only slightly more than 50% service at Alanje and Divisa. Mechanical dehumidifiers were also in less than 50% service. Without good maintenance of air conditioning and dehumidifiers all other efforts will be nullified because seed will continue to mold, die and be more susceptible to insect attacks while in storage.

7. Equipment is needed for processing sorghum seed. Sorghum seed produced by ENASEM was observed to be heavily contaminated with Manisuris spp. weed seed. These were not adequately removed by the air screen cleaner but a

portion of the lot was transported to Tocumen and processed over a gravity table. The gravity table performed a 100% removal of the weed seed with negligible loss of good seed. Such a piece of equipment does not exist at any of the ENASEM facilities.

8. While this consultant is not an economist it is obvious that the large deficits projected by tables 2 and 3 cannot be tolerated for very long. One area of operations that was most impressive was the large amount of administrative and clerical personnel in relation to the work force and projected amounts of seed sales. It is recognized that governments require many reports, plans, etc., but designation of ENASEM as an empressa should carry with it the duty to operate at a small profit or at least at no loss. The budget for 1977-78 at the National level (table 4) contains many items which perhaps could be delayed until the cash flow situation is improved. It can be noted by table 5 that the entire labor budget for the Panama facility is $7,862 approximately the same as 1 Ing. Agronomo. Therefore, it is necessary to minimize need for new staff by maximum utilization manpower already available.

9. Throughout the entire seed program are a group of young enthusiastic technicians who appear to want to do a good job. Nowhere is there anyone who has had more than basic training in seeds at short courses held in Honduras at Escuela Agricola Panamericana. There should be a nucleus of people with in depth training in seed production, seed processing but more importantly seed program development.

Recommended Actions on Constraints to Seed Program

1. a. harvest and drying procedures should be monitored carefully.

EMPRESA NACIONAL DE SEMILLAS

TABLE 4

Dirección de Economía y Finanzas
Departamento de Programación y Presupuesto
Presupuesto a Nivel Nacional
Año 1977 - 1978

Objeto del gasto	Total	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Sept.	Oct.	Nov.	Dic.
Inversión													
Materiales e Insumo:													
Pebutrin	1,000.00	-	-	500.00	500.00								
Photorin	1,000.00			500.00	500.00								
Hilo de coser													
Finca de Chame													
Fertilizantes													
Abono completo 12-24-12	2,435.00				1,217.50	1,217.50							
Nitrógeno-Urea 46%	1,500.00				750.00	750.00							
Herbicidas													
Hoja angosta STAM-L8-10	1,707.50				853.75	853.75							
Hoja ancha 2-4-5T	185.50				92.75	92.75							
Insecticidas													
Aldrin en polvo	100.00				50.00	50.00							
Endrin líquido	72.00				36.00	36.00							
Maquinaria y equipo													
Aire acondicionado	7,000.00		2,000.00	2,000.00	2,000.00	1,000.00							
Cilindros	6,000.00					3,000.00	3,000.00						
Equipo de laboratorio	11,000.00			2,000.00	2,000.00	2,000.00	2,000.00	2,000.00	1,000.00				
Reparaciones y Manteni.	7,000.00			2,000.00	1,000.00	2,000.00	1,000.00	1,000.00					
Sistema de riego	20,000.00			7,000.00	5,000.00	5,000.00	3,000.00						
Administración y Op.													
Salarios, Admón y Téc.	27,300.00	2,275.00	2,275.00	2,275.00	2,275.00	2,275.00	2,275.00	2,275.00	2.275.00	2.275.00	2.275.00	2,275.00	2,275.00
Gastos de Representac.	2,400.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Arrendamiento Ofic. Cen.	4,800.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00
Publicaciones e Impresi.	1,200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mantenimiento y Rep.	9,000.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
Papelería y Utiles de Of.	5,000.00	416.67	416.67	416.67	416.67	416.67	416.67	416.67	416.67	416.67	416.67	416.67	416.67
Combustible y Lubricante	5,400.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00	450.00
Materiales y Suministros	8,000.00	666.67	666.67	666.67	666.67	666.67	666.67	666.67	666.67	666.67	666.67	666.67	666.67
Gastos Generales	24,737.00	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42	2,061.42
Viáticos Nacionales	12,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
Viajes aéreos	3,752.00	312.67	312.67	312.67	312.67	312.67	312.67	312.67	312.67	312.67	312.67	312.67	312.67

Empresa Nacional de Semillas

TABLE 5

Dirección de Economía y Finanzas
Departamento de Programación y Presupuesto

Presupuesto para Planta de Panamá
Año 1977-1978

Presupuesto Inversión	Totales	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Sept.	Oct.	Nov.	Dic
Materiales e insumos													
Pibutrin	805.00			402.50	402.50								
Photorin	805.00			402.50	402.50								
Hilo de coser	460.00			60.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	
Sacos	7,130.00									2,000.00	1,710.00	1,710.00	1,710.00
Maquinaria y equipo													
Cosedora de sacos	460.00			100.00					180.00	180.00			
Deshumecedores	920.00					920.00							
Carretilla de mano	184.00								184.00				
Limpiadora de granos	1,426.00							1,426.00					
Reparaciones y Manten.	16,000.00			6,000.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00				
Presupuesto													
Administración y Op.													
Salarios peones	7,862.40	748.80	748.80	748.80	624.00	624.00	624.00	624.00	624.00	624.00	624.00	624.00	624.00
Salarios Adminis.y Téc.	10,800.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00
Arrendamiento	6,300.00	1,260.00	1,260.00	1,260.00	1,260.00	1,260.00							
Publicaciones e impre.	600.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Mantenimiento y Rep.	6,000.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
Papelería y ut.de Of.	1,000.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	84.00	84.00	84.00	84.00
Combustible y lubric.	3,600.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
Materiales y suminis.	4,000.00	333.00	333.00	333.00	333.00	333.00	333.00	333.00	333.00	334.00	334.00	334.00	334.00
Gastos generales	-	-	-	-	-	-	-	-	-	-	-	-	
Fletes	5,333.00	-	-	-	1,333.00	1,333.00	1,333.00	1,133.00					
Viáticos	1,416.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00	118.00

Drying air should be no more than 110°F and seed should enter the dryer no more than 8 hours after harvest. The shorter the time between harvest and initiation of drying the better. This phase of the operations was not observed but conversations on policies indicate that this is probably well controlled and presents less problems than other areas.

Combines should be checked in operation to insure that excessive damage is not occurring to seeds. Rice is very resistant to mechanical damage but too fast cylinder speeds and too close concave clearance can cause excessive removal of hulls by the combine.

Harvested and dried seeds should be placed in conditioned storage as soon as possible - preferably within a few days of drying.

b. Repair all existing mechanical equipment in the conditioned warehouses as needed. Non servicable or missing equipment should be replaced as soon as possible. A parts list and address of the company who can supply needed parts are included in Appendix B.

There have been problems with compressors on air conditioners and dehumidifiers burning out, repeatedly due to low voltage. The voltage sensor shown in Appendix C is capable of turning off equipment when voltage is outside a pre-selected range and re-starting when voltage is again correct. Such devices are available for both 3 phase or single phase applications. They are relatively easy for a competent electrician to install.

c. All conditioned warehouses should be operated so that temperatures no higher than 70°F and a relative humidity between 50 and 55% will be maintained. Repair and proper operation of the dehumidifier is essential for this condition.

d. Attend to cleanliness and sanitation of the processing plant and

warehouse space to minimize re-infestation of insects. All trash from the cleaning process and any seed lots which go out of condition should be discarded and removed from the vicinity immediately. Bags of trash sitting around the building, corners of buildings not properly cleaned, seed samples in the laboratory in unsealed containers and the bottoms of elevator boots that were not cleaned are some of the major sources of insect infestation. Good chemical products for insect control are in use by ENASEM but without adequate sanitation to compliment the chemicals are not the answer.

2. It is recommended that for 1977 and 1978 the current policies of tagging seeds that do not meet purity standards as "selected seeds" not "certified seeds" be continued. the current policy of 97% purity standard for certified Nilo varieties is probably adequate until better stocks are available even though this does not conform to the seed law (appendix A). Newer varieties with better planting stocks available should be produced under the highest standards that are practical. A proposal for production of better foundation stocks follows with the next recommendation.

3. It is recommended that a Foundation Seed Stock project be officially established under the supervision of the faculty of Agronomy of the University of Panama. This project should have the responsibility to:

a. Accept new varieties released for production in Panama and increase them under rigid control to an adequate amount for sale to ENASEM or farmers for further production and distribution.

b. Maintain pure stocks of existing varieties so long as they are needed or until replaced by better material. Not: plant breeders at Univ. of Panama or IDIAP should have responsibility for purifying

any existing varieties needed in the program before they are turned over to Foundation Seed Stocks.

c. Produce and maintain inbred lines of any publicly released hybrids.

d. Store small oversupply of all seed they produce (approximately 20%) for rapid re-supply in case of natural disaster such as drought, flood, etc.

The University of Panama is the logical choice to administer the designated Foundation Seed Stock because:

a. They have the most experienced seed producers in the government service in Lic Lopez and Dr. Espenosa.

b. A good seed processing facility is already in existence at Tocuman.

c. Some conditioned storage space is also available at Tocuman.

d. The Foundation Seed Stock manager would have ready technical advice from scientists on the staff of the faculty of Agronomy.

To make this project operational it would be necessary to

a. Officially sanction such a project.

b. Provide operating capital for salaries as well as contract seed production.

c. Provide one additional conditioned warehouse and one vehicle (pickup).

d. Designate a manager and provide him with a minimum of clerical assistance and office space.

e. Empower the project to sell seeds to other government agencies such as ENASEM or to private growers.

This project could not be expected to be self sufficient until a strong private seed trade in addition to ENASEM can be developed in

cooperation with a seed certification system.

Table 5. Probable cost for a Foundation Seed Stock.

Item	Estimated Cost (B)
Salaries, Adm.	$9,500.00
Production workers	3,000.00
Travel	2,000.00
Chemicals	900.00
Office supplies	300.00
Maintenance	1,200.00
Bags	800.00
Contract production	13,000.00
Sub-Total	27,700.00
Sales of seed 800 qq @ $30	$24,000.00

d operating loss $3,700.

Item	Estimated Cost (B)
Conditioned Warehouse 800 ft^2	20,000.00
Vehicle	5,000.00
Miscellaneous equipment	2,000.00
Capital Outlay	$27,000.000
Expected first year cost	$30,700.00

By year five the Foundation Seed Stock organization should begin to be self sufficient and even be able to return some funds to the University for maintenance and replacement of processing equipment or other needed improvements. These assumptions are of course based on a continuing supply of new and better genetic material which will inturn stimulate interest in seed production and sales.

The Foundation Seed Stock project should not be a commercial seed sales agency and should not be placed under too much pressure to be self sufficient or return surplus since their primary aim must be the support of Panama's agricultural production with high quality genetic material. Some high volume crops such as rice or corn may return much more than production and distribution costs but other crops such as beans may never return enough to justify production on purely economic reasons. However, the smaller crops are also highly important and cannot be ignored.

4. A certification system and a central quality control laboratory are both needed.

a. Specific recommendations for organization of a seed certification organization are difficult at this time since not time was spent with IDIAP who is now responsible for seed certification.

Some recommendations are:

(1) Seed certification should be a quality assurance program operated by people with special training in the field.

(2) A seed certification program is not necessary if only the seed of ENASEM are to be certified. This can be done through administrative supervision.

(3) A government policy of support for all levels of agricultural production is necessary for a certification system to work.

(4) More specific recommendations should be made after in depth discussions with IDIAP, MIDA and private farmers concerning desirability of a comprehensive program.

b. The quality control laboratories at the three ENASEM facilities are adequate for their needs with some minor replacement of equipment.

Their current interest in seed health testing while commendable is beyond the function of government company organization such as ENASEM and would require additional trained personnel and expensive equipment. As was previously noted the expected income of ENASEM does not permit such large outlays of funds as would be required for professional staff for three pathology laboratories.

A more logical solution would be for IDIAP or University of Panama to do research on seed pathology problems in Panama and give technical advice to ENASEM. Professora Blanca de Hernandez at the University of Panama has had training and experience in seed health testing and is qualified to give such support as requested. It is assumed that IDIAP also has or can develop this capability but no direct contact was made.

c. As a part of the development of the seed program it will be desirable for IDIAP to develop a seed technology laboratory capable of seed testing for seed certification service testing for farmers and other agencies of the government.

Details of this laboratory are not presented here because the ENASEM facilities can serve adequately with back-up from a plant pathology laboratory until the Foundation Seed Stock project and the certification system have trained personnel and begin to function.

Specifications for this laboratory and training for its oepration can be provided by MSU/STL if requested by USAID/Panama.

5. To enhance acceptance of ENASEM seed it will be necessary to improve its technical operations in all areas as previously noted. Much has been done to improve the image of the program through designation of ENASEM and maintaining the appearance of the facilities at Divisa and Alanje.

New varieties to maximize agricultural output at as many levels of technical management as practical along with a maximum educational effort to ensure that purchasers of the seed understand the advantages, disadvantages and technical requirements of the variety will do much to aid acceptance.

Some new varieties have been added to the program and should help alleviate some of the acceptance problems. Staff at ENASEM and extension personnel are cautioned not to "oversell" the new varieties. A farmer who plants a variety requiring high inputs and good land using land and management practices that could better utilize the existing Nilo varieties will most likely fail and then provide much negative publicity for both the variety and ENASEM.

Many new varieties of rice and corn are tested by the University of Costa Rica each year and IDIAP will also be providing research inputs. Close coordination of information from these sources should provide a steady supply of replacement genetic material as needed. For example: I am informed by Dr. Chester Goodrich that new lines from CIMMYT could be available for release about every three years. New varieties which are truly better released with a good promotional program can be a powerful educational tool to spread acceptance of varieties and new practices.

Price is of secondary importance if the seed material is truly better but with self or open pollinated varieties there is no great incentive for a farmer to pay high prices if he can store the seeds himself. For this reason a seed price on such crops can seldom be sustained much over twice the grain price after the variety has become established.

6. Maintenance is a perpetual problem in all processing facilities. There is no way to "solve" the maintenance problem in the sense that it will no longer be a problem. The only answer is to establish a good maintenance policy and continue supervision or enforcement of it. Some suggestions for maintenance procedures are in Appendix B. Much progress has been made in this direction. It is recommended that higher administration support ENASEM through assistance in rapid resupply of repair and maintenance items that must be imported and authorization to maintain a basic stock of parts for selected machinery.

Appendix C presents lists of parts and other maintenance information needed by ENASEM. In addition several catalogs and parts manuals have been forwarded. These pieces of information will not be reiterated here but it is recommended that new dehumidifiers be purchased to replace the missing and inoperable units at Alanje and Divisa.

The units should be:

Heavy duty industrial type, Portable with casters, refrigeration type dehumidifiers capable of removal of at least 2 pints of water per hour at 60°F and 60% RH. Unit to be operable on 220 V., 60 hz., 1 ph. complete with 5 gallon capacity condensate disposal pail and hose connection for outside drain. Dehumidifier to be Remington Model D-20 as manufactured by Remington air conditioning, climate control Division, The Singer Company, Auburn, New York or approved equal.

A total of 14 are needed - 6 for Divisa and 8 for Alanje. Minimum need is 4 for Alenje and 3 for Divisa. Estimated cost $800/unit FOB supplier.

Maximum cost	$11,200
Minimum cost	$ 5,600

The minimum number should be ordered as soon as possible. Other units can be added in the coming years' budgets.

All air conditioners needing repair should be placed in operation as soon as possible. This consists of approximately 10 units. All units are now more than five years old. Therefore, it is recommended that a program of replacement of 2 units per year at Divisa and 3 units per year be initiated in the maintenance budget. Specifications for the new units will be equal to the ones replaced.

7. For processing sorghum seed it is recommended that arrangements be made with the University of Panama Faculty of Agronomy to utilize their facility at Tocumen for the next two crop years.

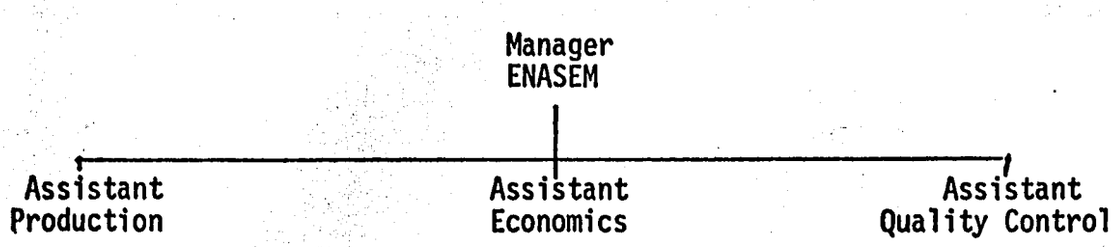
At whatever time funds are available a gravity table and elevators for conveying seed should be installed at Divisa. Divisa is recommended since it is in the dryest area and therefore, the expected center of any sorghum development.

Specifications for the gravity table and an elevator are included in Appendix C with other equipment and maintenance information items.

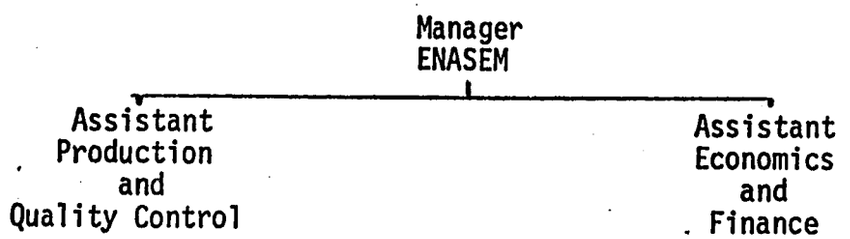
8. Overhead should be kept to a minimum by utilization of permanent staff to the maximum and prevention of proliferation of research type activities within ENASEM.

Examples of such decisions are:

a. At the national level there are programmed a manager and 3 assistants



At the level of production now and the foreseeable future a combination of the assistant for production and quality control is more logical.



b. Quality control laboratories should be kep simple in line with seed quality standards.

c. Keep as much of the maintenance budget intact as possible and insure that maintenance resources are well utilized.

d. Keep new varieties in the supply system that are better than existing varieties. This will enhance sales and increase cash flow.

e. Insist on maximum utilization of all personnel and minimize proliferation of management and clerical positions.

9. The following training programs are recommended:

a. Gladys Escala De Famiglietti - M.S. Agricultural Economics with minor in seed technology.

b. Agronomo Leonidas Urena, Jorge Ceballos and two others to be selected -3 month seed improvement training course for foreign students sponsored by USAID at Mississippi State University. Note: Understanding of English necessary.

c. For longer range needs, two people should be selected for Master of Science level training in seed technology for future manager and assistant for production and quality control.

d. At present IDIAP has responsibility for seed certification but currently (to my knowledge) does not have trained people.

It is recommended that one person be selected for Master of Science training in seed technology at MSU/STL and that arrangement be made with the University of Costa Rica, Seed and Grain Laboratory for 3-6 months training for one technician at that facility.

10. New processing equipment needed:

a. Gravity table for sorghum processing mentioned above is needed.

b. Repair parts for Crippen cleaners listed in Appendix C are for Crippen H 434 A at Alanje. This machine should be replaced by a Crippen H 442 as soon as funds are available. This is the only machine listed that should be an "only source item" because the H 442 has the same height and length as the H 434 and therefore, will require no re-design of the equipment.

c. Length graders at Divisa and Panama are very old but operating well. They should be replaced but at the lowest priority. They should serve several years more. When funds become available specifications for more modern equipment will be supplied as requested.

Discussions with University of Panama

The research and development program of the Faculty of Agronomy was discussed with Dr. Ezequiel Espinosa, acting dean of the faculty,and recommendations were made to develop a Foundation Seed Stock project. Certain of the functions of such a project are now a part of the program but there is no official designation of the project. He informed this consultant that some discussions had been held with MIDA and that there is interest in such an effort. Efforts are under way to re-establish

pure stocks of Nilo 1 and Nilo 2 rice varieties. New strains of corn are under production at Tocumen and in Chiriqui.

In a conversation concerning corn production with Dr. Chester Goodrich we were informed that there are currently about 1.5 ha. of a new variety of corn, Tocumen 74-28,which will be available to farmers and ENASEM at the end of this growing season. He indicates that new varieties arrive from CIMMYT each year for testing and about every three years there is enough improvement to justify release of a new variety.

Discussions with Dr. Gaspar Silvera concerning the legume project and inspection of seed stocks indicated enough good soybean seed to plant about 130 ha. This amount will be planted at Rio Hato for increase and research purposes. The goal is for production of about 6,000 ha. to supply the internal market for the country.

The seed processing plant at Tocumen is adequate for processing soybean seed for current needs. As the program develops there will be a need for a spiral separator. This should not be needed for at least 2 years. Current cost for the equipment should be:

Spiral separator	$2,500.
Elevator for clean seed	1,250
Misc. spouting, etc.	250
Total FOB Supplier	$3,000.

Detailed specifications can be supplied as the need arises.

Dr. Sylvera requested assistance in harvesting and handling for December and it is anticipated that this consultant will return to Panama December 5-17, 1977. In addition he requested recommendation of a soybean production specialist to assist him in November 1977. At our suggestion contact was made with:

Dr. Wayne Jordan

Mississippi Cooperative Extension Service

Mississippi State, MS 39762.

Storage and processing facilities were reviewed with Lic. Lopez. The processing plant as indicated was in good condition. He requested specifications and/or catalog information on the following:

1. Gustafson seed treaters, mixing tanks and film coat attachments.
2. Remington D-20 dehumidifier
3. Dryomatic dehumidifier 25C
4. New screens for Crippen H 442
5. Parts for Matthews Model 600 E grain dryer.

Information on all these were forwarded through USAID/Panama or are in Appendix C.

If the rec ndation for establishment of the Foundation Seed Stock project is accepted it is recommended that Lic. Lopez be in charge. He has by for the most seed production experience of anyone available. It is recommended further that he attend the Seed Improvement Short Course for Foreign Students at MSU/STL in 1978 for refresher information.

APPENDIX A

Seed Law

Decreto No 132 (De 13 de Abril de 1967)

Republica de Panama

DECRETO No. 132

(De 13 de Abril de 1967)

sobre

REGLAMENTACION DE PRODUCCION, IMPORTACION, EXPORTACION, COMERCIALIZACION Y ROTULACION DE SEMILLAS EN EL PAIS

Ministerio de Agricultura, Comercio e Industrias

REPUBLICA DE PANAMA

DECRETO No 132
(De 13 de abril de 1967)

Por el cual se dictan medidas que regulan la producción, importación, exportación y comercialización de semillas

EL PRESIDENTE DE LA REPUBLICA

en uso de las facultades que se derivan del Artículo 237 de la Constitución Nacional y del Decreto Ley No. 20 de 1o. de septiembre de 1966 sobre Protección Fitosanitaria,

C O N S I D E R A N D O:

1o.- Que las disposiciones sobre cuarentena para plantas afectan la producción, importación, exportación y la comercialización de semillas en el territorio nacional, ya que estas disposiciones son aplicadas para evitar la introducción de insectos y enfermedades de plantas que no se encuentran ampliamente diseminados en el país.

2o.- Que es indispensable asegurar que las semillas que se venden como materiel de propagación no sean adulteradas y para ello es preciso que sean rotuladas verazmente a fin de indicar con claridad lo que se ofrece al público en venta.

3o.- Que deben exigirse ciertos requisitos mínimos en la calidad de las semillas que se expenden con miras a proteger e impulsar la agricultura e industrias conexas en el país.

D E C R E T A:

ARTICULO 1o.- Se autoriza al Ministerio de Agricultura, Comercio e Industrias para regular la producción, importación y exportación de semillas, la comercialización y la rotulación de las mismas y para establecer los requisitos mínimos en la calidad de las semillas que se expendan al público de acuerdo con las disposiciones del presente Decreto.

ARTICULO 2o.- El Ministerio de Agricultura, Comercio e Industrias elaborará y pondrá en vigencia, cuando sean necesarias, regulaciones complementarias a las disposiciones del presente Decreto con miras a hacer más efectivo el cumplimiento de dichas disposiciones.

ARTICULO 3o.- Para los efectos de este Decreto se entiende por semilla: los frutos o partes de éstos, así como las partes de vegetales o vegetales completos que puedan utilizarse para la propagación de las diferentes especies de la vegetación.

ARTICULO 4o.- Para hacer importaciones de semillas de plantas cultivadas se requerirá el permiso del Ministerio de Agricultura, Comercio e Industrias y en el caso de variedades que son susceptibles a enfermedades existentes en el país o que no reunan características agronómicas deseables según se haya demostrado en ensayos llevados a cabo previamente, estarán limitadas a cantidades pequeñas para fines de experimentación y multiplicación.

ARTICULO 5o.- El análisis y examen de semillas que sea necesario practicar para el ejercicio del presente Decreto lo harán los funcionarios autorizados del Ministerio de Agricultura, Comercio e Industrias siguiendo los métodos y procedimientos prescritos en las reglas internacionales publicadas por The International Seed Testing Association.

ARTICULO 6o.-

A. Se prohibe importar, vender u ofrecer en venta y transportar semillas destinadas para la siembra en el territorio nacional si éstas no reunen los siguientes requisitos mínimos:

1.- Los recipientes o envases en que se expenden las semillas deben ser nuevos y estar rotulados en tal forma que se dé una información completa relativa a la identidad, calidad, tratamiento y origen de las semillas.

2.- Las pruebas de laboratorio para determinar el porcentaje de germinación de las semillas que se ofrezcan en venta deben haberse efectuado dentro de un período de antelación a su expendio no mayor de ocho meses, excluyendo el mes calendario en que se efectuó la prueba, siempre y cuando sean almacenadas bajo condiciones óptimas que aseguren su conservación. El Ministerio de Agricultura, Comercio e Industriaspuede, sin embargo, establecer un período menor de ocho meses para aquellas especies que bajo condiciones normales de almacenamiento se ha probado que pierden su viabilidad en un período más corto.

3.- Las semillas que han sido tratadas con productos químicos deben llevar una etiqueta de precaución que diga cuál es la identidad y dosis del producto químico utilizado y, además, indique si es venenoso para los humanos y los animales.

4.- Las semillas no deben haber sido adulteradas de ninguna manera y deben reunir condiciones que permitan utilizarlas como material de propagación.

5.- Las semillas que se expenden no deben contener más de 0.2% por peso de semillas de malezas, excepto en aquellas especies que por disposiciones del Ministerio de Agricultura, Comercio e Industrias se les establezcan índices de tolerancia mayores.

6.- Las semillas que se expendan deben poseer un valor real mínimo de 70%, excepto en aquellas especies de importancia económica para el país que no sean capaces de alcanzar 70% del valor real y de las cuales el Ministerio de Agricultura, Comercio e Industrias publicará una lista donde se indique la especie y los porcentajes del valor real correspondientes a cada caso.

B. Se prohibe quitar, destruír o alterar las etiquetas o rótulos que se adhieran a los envases, así como alterar o sustituír las semillas que reuniendo los requisitos establecidos por el presente Decreto se ofrezcan en venta al público.

ARTICULO 7o.- Quedan exentas de las disposiciones de este Decreto:

1.- Las semillas [illegible] no destinadas para la siembra sino para otros fines siempre que llenen los requisitos de rotulación y tengan la documentación correspondiente.

2.- Las semillas que vayan consignadas a una planta procesadora con el propósito de que sean limpiadas, clasificadas, tratadas y ensacadas para luego ser destinadas a la siembra, siempre que ésto vaya indicado en las facturas y rótulos que amparan estas semillas.

3.- Las semillas que se importen con la debida autorización del Ministerio de Agricultura, Comercio e Industrias para fines de experimentación o para programas de mejoramiento genético, siempre que así haya sido declarado y las importaciones estén reducidas a cantidades limitadas.

4.- Las semillas que se importen al país para su multiplicación y el producto resultante se destine para la exportación, es decir, que no sean vendidas en el territorio nacional.

5.- Las semillas que habiendo sido producidas en la República de Panamá, con excepción de las mencionadas en el artículo anterior, hayan sido devueltas de otro país al que se exportaron.

6.- Las personas que sólo se dedican al transporte de semillas, y no al negocio de producir, procesar o vender éstas.

ARTICULO 8o.- Se prohibe la utilización de falsa propaganda relativa a la oferta de venta de semillas. Las personas o agencias publicitarias que se dedican a la divulgación de propaganda comercial sobre semillas deben acatar las disposiciones de este Decreto y si incurren en violaciones al mismo serán sancionadas, a menos que proporcionen al Ministerio de Agricultura, Comercio e Industrias el nombre y dirección de la persona o empresa responsable de la falsa propaganda hecha.

ARTICULO 9o.- Toda persona o entidad que se dedique a la venta, u ofrezca para la venta semillas en el territorio nacional debe mantener por un período de tres años registros completos relativos al origen, germinación, pureza y cualesquiera otras informaciones relativas a la calidad de las semillas. El Ministerio de Agricultura, Comercio e Industrias por intermedio de sus agentes autorizados podrá inspeccionar estos registros para los efectos de hacer cumplir las disposiciones de este Decreto.

ARTICULO 10.- El Ministerio de Agricultura, Comercio e Industrias por intermedio de sus departamentos técnicos está autorizado para establecer normas con miras a multiplicar y certificar semillas de variedades mejoradas, bien sea para ser utilizadas en el territorio nacional o que se destinen para la exportación. El programa de certificación de semillas ha de ser establecido y manejado en forma similar a programas afines que estén operando en otros países con los cuales Panamá mantiene intercambio comercial. Este programa de certificación de semillas podrá reconocer y aceptar los grados de clasificación y requisitos mínimos que se usan en dichos países, siempre que también sean reconocidos los grados de clasificación y requisitos mínimos que se establezcan en Panamá.

ARTICULO 11.- El Ministerio de Agricultura, Comercio e Industrias queda comisionado para establecer, mantener y modificar cuando sea necesario una lista de malezas consideradas como perniciosas o difíciles de erradicar y establecerá restricciones y grados de tolerancia de semillas de estas malezas en las semillas que se ofrezcan en venta.

ARTICULO 12.- Cualquier semilla destinada para siembra que sea vendida, ofrecida en venta, transportada dentro del territorio nacional, o importada, violando cualesquiera de las disposiciones del presente Decreto será confiscada. En caso de que así fuere, se dispondrá del material confiscado de cualesquiera de las siguientes maneras:

1.- Devolviendo a su dueño la semilla decomisada al reclamarla éste, siempre que pague la multa, los gastos de almacenaje, manejos y otros costos. Así mismo debe dar la seguridad de que no venderá la semilla decomisada como tal y que en cambio le dará otro uso.

2.- Vendiendo la semilla decomisada para ser utilizada con otros fines que no sean los de siembra. En este caso el producto de la venta, descontando los gastos, irá al Tesoro Nacional.

3.- Destruyendo la semilla decomisada si su condición así lo amerita.

ARTICULO 13.- Cualesquiera personas que violare las disposiciones del presente Decreto será sancionada con una multa no mayor de mil Balboas (B/ 1,000,00). Esta sanción será impuesta por el Ministerio de Agricultura, Comercio e Industrias.

COMUNIQUESE Y PUBLIQUESE

Dado en la ciudad de Panamá a los 13 días del mes de Abril de mil novecientos sesenta y siete.

MARCO A. ROBLES

El Ministro de Agricultura,
Comercio e Industrias

RUBEN D. CARLES JR.,

yader.-

ANEXO - 1

DEFINICIONES

Persona: Cualquier persona individual, sociedad, corporación, compañía o asociación.

Semilla Agrícola: Aquéllas semillas de plantas cultivadas en el país incluyendo pastos, forrajes, césped ornamental, cereales, fibras y otros cultivos agronómicos.

Semilla Hortícola: Aquéllas que se siembran en huertos y granjas hortícolas y que se venden dentro del país como semillas de hortalizas.

Semilla de mala hierba: Se refiere a las semillas de plantas reconocidas en el país como malas hierbas incluyendo las denominadas "nocivas o perniciosas".

Semilla de malas hierbas nocivas: Se refiere a aquéllas malas hierbas que una vez arraigadas son muy destructivas y difíciles de controlar aún por medio de prácticas culturales (prohibidas), y aquéllas que pueden ser controladas con buenas prácticas culturales (restringidas).

Semilla Genética: Aquéllas obtenidas por selección o cruzamiento de semillas de origen conocido, con no más de una multiplicación a partir del linaje original.

Semilla de Fundación: Aquélla producida a base de la semilla genética y bajo el control estricto de los investigadores que la obtuvieron y de los inspectores de certificación.

Semilla Registrada: Es aquélla obtenida de la de "Fundación", multiplicada bajo estricta vigilancia de los inspectores de certificación.

Semilla Certificada: Es la semilla obtenida de la "registrada" que ha sido cultivada, procesada, envasada, y rotulada bajo el control de los inspectores de certificación. Cumple con los requisitos de identidad varietal, pureza botánica y germinación, según las normas de certificación.

Semilleros: Todo campo destinado a la producción de semillas "certificadas".

Estación Experimental: Son los establecimientos dedicados a la producción de semillas "genéticas".

Identidad Botánica: La uniforme y completa concordancia de toda semilla con la especie o variedad botánicamente identificada.

Semilla Pura: Todas las que corresponden a la especie y variedad analizada, y se pueda reconocer su identidad por el aspecto exterior. Incluye aquéllas semillas normalmente desarrolladas y no mutiladas o imperfectamente desarrolladas con la condición de que puedan producir gérmenes normales.

Impurezas: Todas las materias que no corresponden a la especie o variedad de semilla que se considera, ya sea materia inerte, como granos quebrados, polvo, piedras, etc., semillas de otras plantas cultivadas y semillas de plantas perjudiciales (malezas).

Poder germinativo: La facultad que tiene la semilla para producir gérmenes normales capaces de continuar su desarrollo en condiciones normales.

Valor real: (Valor Agrícola). El valor real de la semilla analizada y correspondiente al producto de la pureza por el poder germinativo dividido por cien.

Rotulación: Comprenderá toda etiqueta y representaciones gráficas manuscritas o impresas en cualquier forma, y que se refiere a cualquier semilla, ya sea a granel o envasada, así también las facturas que las amparan.

Registro: Comprende el archivo de toda información relativa al embarque o embarques correspondientes, e incluye una muestra de cada lote de semilla.

Venta detenida: Se refiere a una orden administrativa por disposición de la Ley que regula la venta, uso, disposición y movimiento de una cantidad determinada de semilla.

Decomiso: Es el proceso legal que se lleva a cabo por orden judicial con relación a una determinada cantidad de semilla.

Especie: Se refiere a una o más especies afines o subespecies que, solas o colectivamente, se conozcan por un nombre común.

Variedad: Se denomina a una subdivisión de la especie que se caracteriza por su crecimiento, rendimiento, período vegetativo, fruto, semilla u otras características que permiten diferenciarlas de otras plantas de la misma especie.

Lote: Se denomina a una cantidad específica de semilla que se identificará por medio de números o marcas.

Híbrido: Cuando se aplica a los cultivos agrícolas se refiere a la primera generación de un cruce hecho bajo condiciones controladas.

Tipo: Se refiere a las características físicas de las variedades que permiten ser clasificadas colectivamente como un solo grupo.

Tratada: Cuando la semilla recibe la aplicación de una sustancia o ha sido sometida a un proceso; sustancia o proceso destinados a reducir, controlar o repeler organismos patógenos, insectos u otras pestes que ataquen dichas semillas o las plántulas provenientes de las mismas.

Nota: Otros términos de uso común que se empleen para la rotulación y los ensayos de semillas, tendrán las mismas aceptaciones que en las normas para ensayo de semillas publicadas por la Asamblea Internacional para el Ensayo de Semillas, adoptadas en Dublin, el 29 de Mayo de 1953 y revisadas en París en la asamblea del 8 de Junio de 1956.

ivq.-

ANEXO - 2

REQUISITOS MINIMOS PARA LA CERTIFICACION DE SEMILLAS

I.- Elegibilidad:

Serán consideradas elegibles para la certificación las variedades de los cultivos que han sido ensayados previamente por el Ministerio de Agricultura, Comercio e Industrias, habiéndose comprobado su adaptabilidad, buenas características agronómicas y resistencia o tolerancia a enfermedades.

II.- Registro de los campos de producción:

Los productores de semillas están en la obligación de solicitar al Ministerio de Agricultura, Comercio e Industrias la inscripción de los campos que destinen para la multiplicación de semillas. Esta solicitud debe hacerse con suficiente anticipación a la fecha de siembra y hacerse en papel sellado indicando: (a) el nombre y dirección del productor, (b) el nombre del encargado del campo, (c) la localización del campo, (d) la especie y la variedad del cultivo, (e) la fuente y origen de la semilla a multiplicar, (f) la clase de semilla a producir y (g) la superficie e historial del campo.

III.- Inspección de los campos de producción:

Los funcionarios autorizados del Ministerio de Agricultura, Comercio e Industrias realizarán inspecciones periódicas a los campos de producción de semillas que han sido inscritos, por cuyos servicios se cobrará al productor los derechos de inspección por hectárea de acuerdo con la especie y la clase de semilla a producir.

IV.- Registro de las plantas procesadoras de semilla:

Toda planta que se destine al procesamiento de semillas debe ser inscrita en el Ministerio de Agricultura, Comercio e Industrias, para lo cual se deberá elevar una solicitud en papel sellado indicando:

a) el nombre y dirección del propietario,
b) el nombre del encargado de la planta,
c) la localización,
d) la descripción del equipo de procesamiento, y
e) las facilidades de almacenaje de las semillas.

V.- Certificación de semillas:

La semilla procesada proveniente de campos que han sido inscritos e inspeccionados será sometida a análisis de laboratorio de [illegible] anterior [illegible] del Ministerio de Agricultura, Comercio e Industrias. Si el análisis resulta favorable en cuanto a los requisitos [illegible] exigidos para la semilla, de acuerdo con la especie y clase, [illegible] sujeto de certificación por lo cual el productor deberá pagar los derechos de certificación por quintal de acuerdo con la especie y clase de semilla.

Los resultados del análisis de laboratorio constituirá la información que ha de aparecer en la etiqueta de certificación. El productor adquirirá a precio de costo una etiqueta por cada envase que vaya a [illegible] usarlo.

ANEXO 3

REQUISITOS PARA LA PRODUCCION DE SEMILLA CERTIFICADA DE ARROZ

I.- Requisitos de campo:

Los terrenos destinados a la producción de semilla de arroz deben ser de buena fertilidad, topográficamente planos, de fácil acceso y claramente aislados o separados de otros campo cultivados con otras variedades de arroz.

En las parcelas donde se hará la multiplicación de semillas no debe haberse cultivado arroz durante los últimos tres años, a menos que en el año anterior se hubiese sembrado la misma variedad a multiplicar y habiendo sido sometida a certificación resultó aprobada.

II.- Requisitos para la plantación:

La plantación debe presentar un buen aspecto general, en lo que se refiere a uniformidad, sanidad, densidad de población de plantas, etc. y estar libre de malezas en toda su extensión. Debe hacerse la depuración del campo en el momento oportuno para eliminarse espigas fuera de tipo o de otras variedades.

Factor para 200 m^2	Fundación	Registrada	Certificada
Otras variedades (espigas)	0	1	2
Malezas perniciosas(plantas)	0	1	2
Arroz rojo (espigas)	0	2	3
Enfermedades trasmisibles por la semilla (espigas %)	Libre	1	2

III.- Requisitos para la semilla:

Factor	Fundación	Registrada	Certificada
Semilla pura (mínimo) %	98	98	98
Germinación (mínimo) %	80	80	80
Materia inerte (máximo) %	2	2	2
Otras variedades (No./Lb.)	0	0	0
Malezas perniciosas	0	0	0
Arroz rojo (No./Lb.)	0	0	0.5
Humedad (máximo) %	12	12	12

ANEXO - 4

REQUISITOS PARA LA PRODUCCION DE SEMILLA CERTIFICADA DE MAIZ

Variedades

I.- Requisitos de campo:

Los terrenos destinados para la producción de semilla certificada de variedades de maíz de polinización libre deben ser de buena fertilidad y drenaje, topográficamente planos y de fácil acceso.

En las parcelas donde se hará la multiplicación de semillas no debe haberse cultivado maíz el año anterior, a menos que la variedad por certificar sea igual a la cultivada anteriormente y habiendo sido sometida a certificación resultó aprobada.

Los campos deben estar separados de otros sembrados de maíz a una distancia no menor de 200 metros. Esta distancia puede reducirse si hay entre los campos barreras naturales, se siembren suficientes surcos de bordura de la misma variedad alrededor del campo o se evite, regulando las fechas de siembra, que el período de floración de los campos vecinos coincida con el de la variedad a multiplicar.

II.- Requisitos para la plantación:

La plantación debe presentar un buen aspecto general, en lo que se refiere a uniformidad de las plantas, sanidad, densidad de población, etc., y estar libre de malezas en toda su extensión. En lo que se refiere a mezcla varietal, ésta no debe exceder de 0.5% de plantas de otra variedad.

III.- Requisitos para la semilla:

Factor	Fundación	Registrada	Certificada
Semilla pura (mínimo) %	98	98	98
Germinación (mínimo) %	80	85	85
Materia inerte (máximo) %	2	2	2
Otras variedades (máximo) %	0	0	0.5
Malezas perniciosas	0	0	0
Humedad (máximo) %	12	12	12

Híbridos

I.- Requisitos de campo:

Los requisitos de campo para la producción de semilla certificada de maíz híbrido son los mismos establecidos para las variedades de polinización libre, a los que deben adicionarse los siguientes:

a) la proporción de planta madre a padre polinizador no debe exceder de 2 a 1 cuando el polinizador es una línea, y de 3 a 1 cuando el polinizador es un híbrido simple o una variedad.

b) el progenitor femenino debe desmanojarse oportunamente; considerando desde el momento en que un 5% de las plantas madres

tienen estigmas receptivos, se rechazará el campo para certificación si en una inspección presenta más de 1% de plantas con panojas que dispersen polen, y,

c) sólo las mazorcas provenientes de las plantas del progenitor femenino se cosecharán como semilla.

II.- Requisitos para la plantación:

La plantación debe presentar un buen aspecto general, en lo que se refiere a uniformidad de las plantas, sanidad, densidad de población, etc. y estar libre de malezas en toda su extensión.

III.- Requisitos para la semilla:

Factor	Fundación	Registrada	Certificada
Semilla pura (mínimo) %	98	98	98
Germinación (mínimo) %	80	85	85
Materia inerte (máximo) %	2	2	2
Pureza varietal (mínimo) %	99	99	98
Malezas perniciosas %	0	0	0
Otras malezas (máximo) %	0	0	1
Humedad (máximo) %	12	12	12

ANEXO - 5

REQUISITOS PARA LA PRODUCCION DE SEMILLA CERTIFICADA DE FRIJOL

I.- Requisitos de campo:

Los terrenos destinados para la producción de semilla certificada de frijol deben ser de buena fertilidad y, drenaje, topográficamente planos y de fácil acceso.

En las parcelas donde se hará la multiplicación de semillas no debe haberse cultivado frijol el año anterior, a menos que la variedad por certificar sea igual a la cultivada anteriormente y habiendo sido sometida a certificación resultó aprobada.

Los campos deben estar separados de otros sembrados de frijol por una distancia no menor de 50 metros, o de 20 metros en caso de existir una barrera natural constituída por vegetación alta y densa.

II.- Requisitos para la plantación:

La plantación debe presentar un buen aspecto general, en lo que se refiere a uniformidad de las plantas, sanidad, densidad de población, etc., y estar libre de malezas en toda su extensión. Además debe reunir los requisitos que se exponen a continuación.

Factor	Fundación	Registrada	Certificada
Otras variedades (máximo)%	0	1	2
Otras especies(máximo)%	0	0	1
Malezas perniciosas	0	0	0
Enfermedades trasmisibles por la semilla(máximo) %	1	1.5	3

III.- Requisitos para la semilla:

Factor	Fundación	Registrada	Certificada
Semilla pura(máximo) %	98	98	98
Germinación(máximo) %	80	85	85
Materia inerte(mínimo) %	2	2	2
Otras variedades	0	0	0
Malezas perniciosas	0	0	0
Humedad (máximo) %	12	12	12

APPENDIX B

Maintenance Routine for Seed Processing Facilities

and

Basic Stock of Repair Parts for Air-screen Cleaners

Daily Maintenance For Panama Seed Processing Plants

1. Before start up each morning sweep down all equipment.

2. Check all bearings, belts, chains etc. for signs of failure.

3. Check elevators for bent, broken or missing elevator cups.

4. Check all screens on the air-screen cleaner for plugged or broken screens. Correct problem if it exists.

5. Inspect brushes and brush carrier rollers for broken or worn parts.

6. Inspect inside roll feed hopper on air-screen cleaner. Remove any string, rope etc. that has collected around the feed roll. String from bags around this feed roll will cause uneven feed across the screens.

7. Sweep all grain and trash from floors.

8. Start plant operating.

9. Recheck adjustment of all machines paying particular attention to the brushes and air adjustment on the air screen machine.

10. Keep floor and working area swept clean all during the day. Seeds on the floor are a source of contamination and a hazard to men working because of poor footing.

11. Do not keep bags or other supplies stored in the processing area as they are a hiding place for rodents and insects as well as a place for contaminating seeds to lodge.

12. The plant manager should make numerous inspections of the equipment during the day to determine if minor adjustments are necessary or to detect development of minor problems and correct them before they reach major proportions.

Between Varieties Cleanup and Maintenance Procedure for Panama Seed Processing Plants

1. All machinery should be swept down from top of elevators to floor.

2. Open bottom boot of all elevators and clean all seeds out.

3. Slowly turn the elevator and inspect each cup for seeds hung in the cup or between cup and belt. Use a screwdriver, knife, piece of wire etc. to remove the seeds that are lodged. Replace or straighten damaged or bent cups as they are noted in this inspection.

4. Check inside head spouts and around head pulley for lodged seeds. Repair any badly worn spots or holes.

5. Check inside of hopper over air screen cleaner and sweep down all seeds and trash hung there.

6. Open the roll feed hopper inspection door and lower the bottom cleanout gate.

7. Remove all seeds from this hopper.

8. Remove all screens from the air screen cleaner.

9. Clean all seeds and bits of trash hung in the screen openings and between the metal and frame of the machine. Utilize this inspection to check for wear or broken places in the metal or machine frame and to tighten up loose joints, nails etc. and repair broken places or replace the screen.

10. Remove the brush carriers from the machine.

11. Clean all seeds lodged on the brush carrier and in the brushes. Utilize this opportunity to check the brush carrier rollers for excessive wear and replace where necessary.

12. Check the brush cables and drive system and repair if necessary.

13. Clean all seeds and trash from inside the machine paying particular attention to the channels for the screen frames and any ledges where a seed may sit and later dislodge. Sweep or vacuum all seeds from the trash pans.

14. Open all inspection doors and remove the cylinders from the length graders and/or width and thickness graders. (Disc separators do not require removal)

15. Remove all seeds and trash from the machines paying particular attention to the feed mechanism and seal around the cylinders and places where seeds may lodge. Utilize this opportunity to check all parts for wear and replace if needed or order new parts in anticipation of need where wear is observed.

16. Sweep floor and remove all seeds and trash from the previous variety.

17. Replace parts in the machines, close all inspection doors and resume cleaning.

18. Check the adjustment on the brushes in the air screen cleaner, readjust air, speed of shake, etc.

19. Check adjustment of the length grader and/or width and thickness graders.

Parts needed in stock at Panama and Alanje for Crippen air screen cleaners:

Name of Part	No. to Stock
Brush carriage roller assembly	12
Ball bearing cable pulley complete wi shaft, lock washer and nut	12
Screen clamp pistol assembly	6
Brush nylon, coarse (4 for No. 1 screen, 4 for No. 2 screen, 4 for No. 3 screen)	12
Brush cable, nylon coated steel	100 ft. coil

Note: Each order must be separate because the Crippen cleaners are different models.

Parts needed in stock at Divisa for Clipper air-screen cleaner:

Name of Part	No. to Stock
Brush carriage roller assembly	12
Cable pulley complete with shaft	12
Screen clamp pistol assembly	6
Brush, nylon, coarse for screens	16
Brush cable, nylon coated steel	100 ft. coil

APPENDIX C

Equipment Information Supplied by Companies and List of Company Representatives

Note: Inclusion of this information does not constitute an endorsement by MSU/STL or USAID of these companies on items of equipment over other equivalent equipment.

Note: This information was obtained at the request of ENASEM and/or University of Panama Faculty of Agronomy.

American Drying Systems
(Panama Representatives)
Cardozi and Lindo
P.O. Box 7342
Phone 60-1155
Mr. Stanley Fidanque
Panama Rep de Panama
(American Dryers)

CEA-Carter International Inc.
500 Seventy-third Avenue, N.E.
Minneapolis, Minnesota 55432
(Hart-Carter, Carter-Day, Superior equipment)

Ferrell-Ross
1621 Wheeler Street
Saginaw, Michigan 48602
Phone (517) 792-8723
(Clipper equipment)

Gustafson Inc.
6350 LBJ Freeway, Suite 180
Dallas, Texas 75240
Phone (214) 661-1334
(Gustafson, Mist-O-Matic equipment)

Mercator Corporation
Mr. Tom Klein
P.O. Box 142
Reading, Pennsylvania 19603
Phone (215) 376-1578
(Crippen, Oliver and various other processing and conveying equipment)

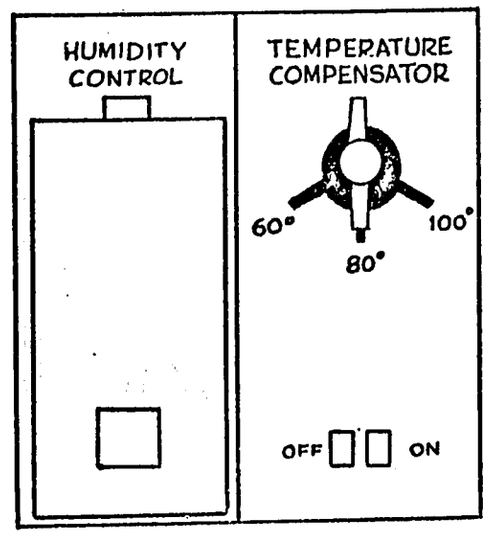
Remington Climate Control Division
The Singer Company
Auburn, New York 13201
(Industrial Dehumidifier)

Time-Mark Corporation
P.O. Box 15127
Tulsa, Oklahoma 74115
Phone (918) 939-5811
(Voltage controls)

Remington
CLIMATE CONTROL

OPERATING INSTRUCTIONS

MOISTURE MAGNET - INDUSTRIAL DEHUMIDIFIER - MODEL D20A-43



GENERAL: The Remington Moisture Magnet is an air dryer not an air conditioner. It will dry air automatically, without appreciably affecting room temperatures. It is not to be confused with complete, 100% air conditioning which gives simultaneous control of both temperature and humidity.

DEHUMIDIFICATION: Make sure dehumidifier is connected to proper voltage (See installation instructions) Push "ON" button.

HUMIDITY CONTROL: A Humidistat controls humidity, once the dehumidifier has been turned on. To set humidistat, turn knurled knob until desired relative humidity is opposite indicator. Do not confuse markings on knob with thermometer used to indicate room temperature. For most purposes, a 50% relative humidity is adequate. Consult Specification Sheet #5285 for special settings.

TEMPERATURE COMPENSATOR: There are three settings available, 60 - 80 - 100 degrees. Turn knob to setting closest to actual temperature of the space to be dehumidified. Check setting occasionally and move if necessary to coincide with room temperature.

AIR FILTER: The Air Filter is located in the right hand end panel. It should be checked and cleaned regularly. To remove air filter for cleaning, insert fingers in two holes located in lower edge of panel. Lift up and out, letting panel drop out from under top flange. IMPORTANT: Position dehumidifier, so that there are no obstructions to air intake and discharge grilles. Level unit to insure proper condensate drainage.

If this Dehumidifier is removed from its installation for shipment, the compressor hold-down nuts must be tightened down to prevent the possibilities of a leak occurring in the hermetic circuit.

*A Trademark of THE SINGER COMPANY

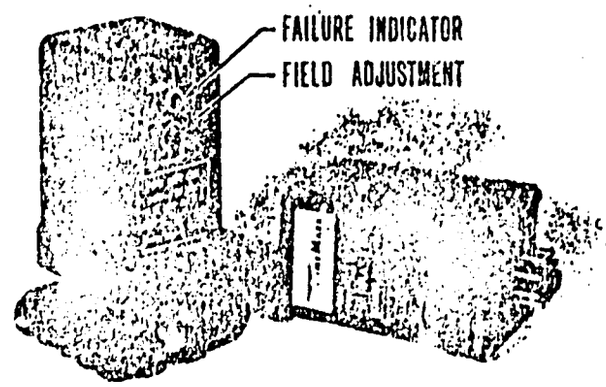
SINGER
THE SINGER COMPANY
AUBURN, NEW YORK 13021

REPLACEMENT PARTS LIST
MODEL – DEHUMIDIFIER

PART NR.	PART DESCRIPTION	MFGR'S NR.	D20B35	D20A43
02003151	Compressor	AJ220FT-206-A4	X	X
02003152	Overload - Comp.	CRA9931-135	X	X
02007045	Capacitor - Run	15MFD/370 VAC	X	X
02000043	Blower Wheel		X	X
21662	Motor	5KSP39FG4573S	X	X
02005593	Switch	2996AH84	X	X
14340	Humidstat		X	X
8389	Relay	3ARR4BC5	X	X
14791	Freezestat		X	X
14820	Filter		X	X
14350	Knob Damper		X	X
10-1-4	Caster		X	X
14700	Drain Pan - Plastic		X	X

TIME MARK

3-PHASE POWER MONITOR



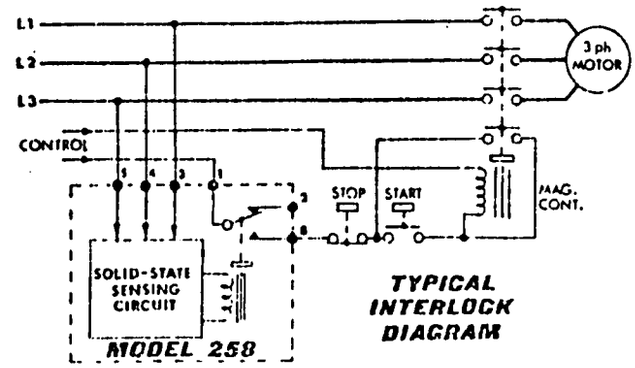
RELAY DROPS OUT ON.....

..LOSS OF ANY PHASE

..LOW VOLTAGE ON ANY OR ALL PHASES

..PHASES REVERSED FROM A-B-C SEQUENCE

AUTOMATIC RESET



TYPICAL INTERLOCK DIAGRAM

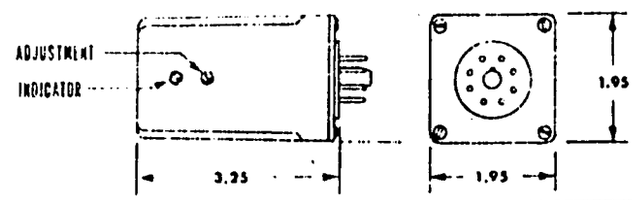
GENERAL INFORMATION

THE MODEL 258 SERIES OF 3-PHASE POWER MONITORS WERE DESIGNED TO CONTINUOUSLY MONITOR 3-PHASE POWER LINES FOR ABNORMAL CONDITIONS. THE DEVICES CONSIST OF A SOLID-STATE VOLTAGE AND PHASE ANGLE SENSING CIRCUIT DRIVING A SPDT ELECTROMECHANICAL RELAY. THE MODEL 258 DOES NOT REQUIRE A NEUTRAL, THEREFORE CAN BE USED WITH EITHER WYE OR DELTA SYSTEMS. THREE MODEL ARE AVAILABLE TO COVER THE 120, 240, AND 480 VAC RANGES. ADJUSTMENT RANGES ARE SUFFICIENTLY WIDE TO ALLOW PROPER ADJUSTMENT WITHIN THESE RANGES. A FAILURE INDICATOR IS ALSO PROVIDED TO AIDE IN ADJUSTMENT AND SYSTEM TROUBLESHOOTING.

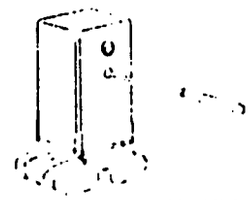
SPECIFICATIONS

MODEL NO. → / FOR USE ON → (VOLTAGE BETWEEN PHASES)	B258B 120	258B 240	A258B 480
MAXIMUM INPUT VOLTAGE	140 VAC 50/60 Hz	260 VAC 50/60 Hz	520 VAC 50/60 Hz
ADJUSTMENT RANGE	85 - 125 VAC	160 - 240 VAC	340 - 480 VAC
POWER CONSUMPTION	½W PER PHASE	½W PER PHASE	1½W PER PHASE
REPEAT ACCURACY (FIXED CONDITIONS)	0.1%	0.1%	0.1%
REPEAT ACCURACY (0-60 DEG. C)	1.3% MAX	1.7% MAX	2.1% MAX
CONTACT RATING	3 AMPS @ 115V	3 AMPS @ 115V	3 AMPS @ 115V
DROP-OUT TIME	.05 SEC MAX	.05 SEC MAX	.05 SEC MAX
DEAD BAND BETWEEN PULL-IN AND DROP-OUT	2% (2.4 VAC)	2% (4.8 VAC)	2% (9.6 VAC)
TRANSIENT PROTECTION	2500 VOLTS FOR 10 MS	2500 VOLTS FOR 10 MS	2500 VOLTS FOR 10 MS

CASE DIMENSIONS



ADJUSTMENT



STEP 1 - CONNECT 3-PHASE POWER TO BE MONITORED TO PINS 3-4-5. MAKE SURE A-B-C SEQUENCE IS OBSERVED.

STEP 2 - TURN FAILURE LEVEL ADJUSTMENT FULLY CLOCKWISE. INDICATOR SHOULD BE ILLUMINATED.

STEP 3 - TURN ADJUSTMENT SLOWLY COUNTER-CLOCKWISE UNTIL INDICATOR LITE GOES OUT. THIS SETTING SHOULD BE CORRECT FOR MOST INSTALLATIONS. IF NUISANCE TRIPS OCCUR, TURN ADJUSTMENT SLIGHTLY FURTHER COUNTER-CLOCKWISE.

ORDERING INFORMATION

TO ORDER STANDARD FIELD ADJUSTABLE MODELS, USE THE MODEL NUMBERS SHOWN AT THE TOP OF THE SPECIFICATIONS SECTION. FOR CASES WHERE FIELD ADJUSTMENT FEATURE IS NOT DESIRABLE, FACTORY-SET MODELS ARE AVAILABLE. FACTORY-SET MODELS ARE IDENTICAL TO THE FIELD ADJUSTABLE TYPES EXCEPT ADJUSTMENT FEATURE AND INDICATOR ARE DELETED. TO ORDER FACTORY-SET MODELS, USE ORDERING CODE BELOW.

EXAMPLE: 460-258-A-390

NOMINAL LINE VOLTAGE — MODEL — FACTORY SET — DROP-OUT VOLTAGE

INDUSTRIAL CONTROLS

TIME MARK
PO BOX 1[illegible]
TULSA, OKLAHOMA [illegible]
TEL 918 [illegible]

TIMEMARK CORPORATION

MODEL 260

VOLTAGE SENSORS

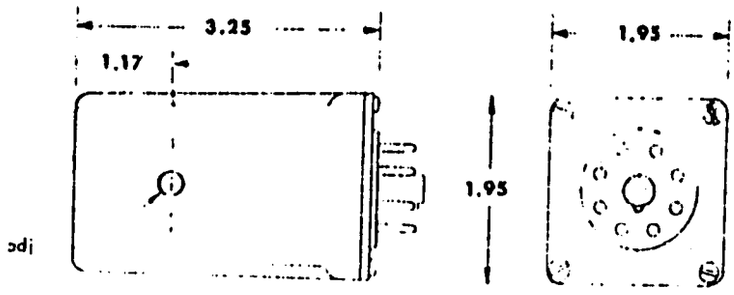
The Model 260 Voltage Sensors consist of a solid state voltage detector that senses a voltage greater than a pre-set value, and causes an internal relay to operate. Both AC and DC models are available in screwdriver adjustable, remote adjustable, and fixed voltage configurations. See ordering code below for models not listed in tabulation or we can manufacture to your specifications.

SPECIFICATIONS

- Set-point stability ±1%
- Standard 8-pin octal base
- Molded dust cover
- 100ms max response time
- Transient & polarity protected
- Continuous duty operation
- Operating temp: 0-55 deg C.

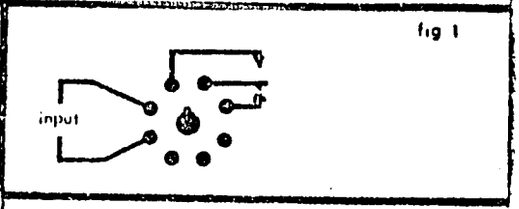
CONTACT RATING

- SPDT 2 amps at 115 VAC or 28 VDC resistive



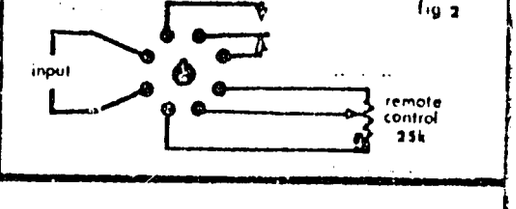
SCREWDRIVER ADJUSTABLE

Part No.	Nominal Voltage	Adjustment Range	Max Voltage	Max Hysterisis	See Fig.
AC-260-B-120	120 VAC	80-130 VAC	150 VAC	0.4 VAC	1
AC-260-B-240	240 VAC	160-250 VAC	270 VAC	0.8 VAC	1
AC-260-B-480	480 VAC	340-480 VAC	520 VAC	1.6 VAC	1



REMOTE ADJUSTABLE

Part No. Part No.	Nominal Voltage	Adjustment Range	Max Voltage	Max Hysterisis	See Fig.
AC-260-C-120	120 VAC	80-130 VAC	150 VAC	0.4 VAC	2
AC-260-C-240	240 VAC	160-250 VAC	270 VAC	0.8 VAC	2
AC-260-C-480	480 VAC	340-480 VAC	520 VAC	1.6 VAC	2



ORDERING CODE: (For models not listed above)

XX-260-X-XXX-XXX or XXX

- AC / DC
- Fixed - A / Screwdriver adj - B / Remote adj - C
- Adjustment Range or Fixed Voltage

- DC models available in any voltage or adjustment range from 30 VDC to 500 VDC. See ordering code.
- FIXED-VOLTAGE models available for either AC or DC operation in any voltage or adjustment range offered above. See ordering code.

July 6, 1977

PRICES FOR CRIPPEN SPARES, CRIPPEN H-442
AND OLIVER 50A

1 - Part No. 12	Eccentric Bearing Complete including Part No. 13 Eccentric Housing, Part No. 15 Eccentric Sleeve and Part No. 16 Eccentric Ball Bearing	$ 109.37
1 -	Eccentric Arm (Maple)	10.80
12- Part No. 457	.028 Medium Brushes @ $9.65 ea.	115.80
6 - Part No. 458	Brush Clamp Assembly @ $2.22 ea.	13.32
100' No. 459	Nylon Brush Cable	45.25
12	Ball Bearing Cable Pulleys including Part No. 105A Shaft and 108 Lock Washer Nut @ $ 9.03 ea.	108.36
2 - Part No. 262	Fan Wheels @ $95.66 ea.	191.32
Total FOB Alma, Michigan, domestic packed		$ 594.22
Export boxing		59.42
Inland Freight to New York		41.00
Total FAS New York vessel, export boxed		$ 694.64

Approx. Gross Shipping Weight: 150 lbs.
Approx. Gross Shipping Volume: 10 cu. ft.

Extra CIF from New York to Panama, Panama (APPROX.) $ 138.00

MERCATOR CORPORATION
P.O. Box 142
Reading, Pa. 19603

July 6, 1977

PRICES FOR CRIPPEN SPARES, CRIPPEN H-442
AND OLIVER 50A

1 - H-442 As described in Bulletin H-376 including four 42" wide x 44" long screens of customer's choice, 5 HP electric motor OTDP, 220/3/60 and manual starter, sheaves, belts and pulleys. Please specify side of waste product discharge, angle of fans and size of screen perforations.

FAS New Orleans, export boxed $ 11,825.00

Extra 42" wide x 44" screens:

Rounds & Oblongs.....$ 70.00 each
Wire Mesh.....$ 82.00 each

Approx. gross shipping weight: 3600 lbs.
Approx. gross shipping volume: 460 cu. ft.

Extra CIF from New Orleans to Panama, Panama (APPROX) 1,682.00

1 - Oliver 50A (specify 16 mesh or 10 mesh "A" deck), including 5 HP electric motor OTDP 220/3/60 and manual starter, aspirator feeder with 1 HP TEFC motor 220/3/60 and manual starter and 20 extra feed of rubber tubing.

FAS New Orleans, export boxed 2,937.00

Approx. gross shipping weight: 1500 lbs.
Approx. gross shipping volume: 120 cu. ft.

Extra "B" deck (specify 30 mesh or linen) 359.00

Approx. gross shipping weight: 100 lbs.
Approx. gross shipping volume: 16 cu. ft.

Extra CIF from New Orleans to Panama, Panama (APPROX)
(Not including extra deck) 499.00

DELIVERIES EX-FACTORY:

Crippen spares	4-6 weeks
Crippen H-442	10-12 weeks
Oliver 50A	18-20 weeks

MERCATOR CORPORATION
P.O. Box 142
Reading, Pa. 19603

July 6, 1977

PRICES FOR CRIPPEN SPARES, CRIPPEN H-442 and OLIVER 50A

You may consider the FAS figures shown firm providing we receive your purchase order and other necessary documents here, in Reading, Pa., on or before August 26, 1977. Afterwards, we reserve the right to review and revise, if necessary, the FAS prices prior to acceptance of purchase order.

Extra charges shown from U.S.A. port to Panama, Panama are approximations only and would be invoiced at their true and actual value at time of shipment.

TERMS OF PAYMENT: To be Determined

MERCATOR CORPORATION
P.O. Box 142
Reading, Pa. 19603

Gravity Table for Divisa.

The gravity table shall be:

Rectangular deck with 5 hp, 220 V., 3 ph., 60 hz., motor, 3 fans in air chest. Deck to be 30" x 60". Unit to be supplied complete with 2 decks, 1 16 mesh "A" deck and 1 30 mesh "B" deck, tailings return elevator and aspirator feeder complete with 1 hp., 220 V., 3 ph., 60 hz. motor and 20 extra feet of rubber flexible air tubing.

Unit to be Oliver 50A gravity table as manufactured by Oliver Mfg. Co., Rocky Ford, Colorado or approved equal.

The elevator shall be belt and bucket type with a capacity of 250 bu per hr; dump hopper in place of standard spout hopper on up leg; transition square to round and 6" adjustable elbow; 2, 6" 2-way y valves; 20' 6", 14 ga. rigid spouting; 4 loose flanges complete with motor and drive operable on 220 V., 1 ph., 60 hz. Discharge height 20'.

Elevator will be installed to accept heavy seed from the gravity table and discharge into bagging or treater bins.

Elevator to be Universal C2-250 or equal.

APPENDIX D

Itinerary

Dr. A.H. Boyd

17 May - 4 June 1977

APPENDIX D

Itinerary

Dr. A.H. Boyd

Panama, 17 May - 4 June 1977

May 17	Leave:	Columbus, MS	SO 130	0712
	Arrive:	Atlanta		0927
	Leave:		DL 1131	1025
	Arrive:	Miami		1240
	Leave:		PA 585	1705
	Arrive:	Panama		1840

18 AM	Arrive:	USAID Offices Make contact with Empressa Nacional de Semillas (ENASEM)
PM		Conferences at ENASEM
19		Accompany staff from ENASEM Panama facility to Tocumen to assist in trials of machinery in processing Sorghum seed. Brief conferences with Lic Lopez. Facultad de Agronomia
20		Travel to Santiago with Ings. Peña and Despaigne. Attend dedication ceremonies, meet minister of Agriculture and return to Panama.
21 22		Weekend - Conferences with Dr. Espinosa
23		At offices of ENASEM and USAID.
24		Fly to David - Visit facilities at Alanje.
25		Continue at Alanje. Return to Panama.
26 AM		ENASEM offices
PM		USAID - Review work to date with Dr. Ray White.
27		Travel to Divisa review facilities and return to Panama.
28 29		Weekend
30		Work on recommendations and discussions with ENASEM (U.S. Holiday)
31		Obtain old reports from USAID - Review previous recommendations and future plans with Lics. Carlos Bartley and Gladys Famiglietti.

June 1 — USAID Offices - Work on draft report. Conference with Dr. Espinosa and Lic. Lopez, Fac. de Agronomia. Univ. de Panama

2 — To Tocumen to meet with University of Panama corn and soybean breeders Drs.Chester Goodrich and Gaspar Silvera.
Discussions with Mr. Ray White and Dr. Espinosa on future technical assistance needs of the soybean breeding project.

3 AM — Return to Tocumen to assist Lic. Lopez with problems in installing dehumidifier and repair on utilization of other equipment.

PM — Preparation for departure at USAID Offices, Conference with Ing. Gabriel Despaigne: Production and quality control - ENASEM

4	Leave:	Panama	PA	586	0900
	Arrive:	Miami			1240
	Leave:		DL	440	1455
	Arrive:	Atlanta			1629
	Leave:		SO	819	1755
	Arrive:	Columbus			1846