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This study was initiated and carried out to gain a better understanding of the quality and condition of the soybeans purchased by EPSA** during the year 1978 within the areas of the soybean program with respect to the levels of moisture of the beans and the percentage of impurities or foreign material in the lots purchased. Information of this type provides the basis for future adjustments of the discount schedule for equitable settlements to both farmers and processors, gives support for changes and improvements at buying stations, and furnishes background data for extension programs to train both buying station personnel and farmers.

Purchase information was collected from EPSA buying stations in Tarapoto, Tingo Maria, Bagua, Jaen, and Satipo. The attached table presents the analysis of the data from all the locations except Satipo.

The data from Satipo presented a different story than the other sites. Of the 25 lots of soybeans purchased, 23 tested 17 percent moisture, and the other two tested 18 percent. When questioned about the problem of storage with such high moisture levels, the manager indicated that no problems had been encountered. The soybeans were transported to the processing plant in Lima up to 4-5 months after purchase, arriving in good condition and testing about 14 percent moisture. Further questioning led to the discovery that the moisture meter was calibrated to indicate the moisture level of corn, but it was necessary to adjust the reading for crops other than corn by using prepared tables (printed in English). This was a matter of lack of knowledge and training of the personnel in the buying station.

With the proper adjustment for soybeans, the 17 percent meter reading on that particular brand of equipment comes out to be 14.5 percent, which is on the high side of the safe storage range.

The data from Satipo indicate only one lot having a one percent level of impurities. This is not the pattern of the foreign matter content that was found in other places, both under rainfed and irrigated production.

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** Empresa Publica de Servicios Agropecuarios

A uniform one-half percent was deducted from the value of all the lots. This is a check-off to the C.N.A. (Confederacion Nacional Agraria) to supply funds for the promotion of soybeans by committees of producers of soybeans. This check-off deduction was made in all purchase locations.

Purchases at Tarapoto and Tingo Maria reflect the greater rainfall and higher relative humidity prevailing in these areas. Almost all of the lots purchased were in the 14-16 percent range of moisture levels. Unfortunately, no record was kept of the lots rejected because of moisture levels higher than 16 percent. In the Bagua-Jaen area, which is semi-arid and partially irrigated, the highest moisture level recorded was 15 percent, the lowest eight percent, with the majority in the 10-13 percent range.

The picture is not so clear with respect to percent of impurities. The data show some lots in the Bagua-Jaen area with impurities up to eight percent, but this is evidently the result of a buying policy difference. In Tarapoto and Tingo Maria, lots above six percent foreign material were rejected for further cleaning, but lots with up to eight percent were purchased in Bagua-Jaen.

The information regarding the weights of purchases probably indicates that the size of farm and acreage of soybeans per farm are greater in the Bagua-Jaen area. At Satipo, all lots purchased were less than 2000 kilos, with the majority less than 500 kilos.

The percentage of weight discounted for moisture and impurities was almost double in Tarapoto-Tingo Maria as compared to Bagua-Jaen. At Satipo, there were no discounts for excess moisture levels or impurities.

According to "Dictan Reglamento de Comercializacion de los Granos Oleaginosos de Produccion Nacional," Resolucion Ministerial No. 0482-77-AL, dated May 18, 1977, the moisture limit for the purchase of soybeans is 16 percent, with a weight discount of one percent for each percent above 14 percent. For impurities the limit is six percent, with a weight discount of one-half percent for each one-half percent above four percent.

The above schedule of limits and discounts was in effect in the Tarapoto and Tingo Maria areas, but in Bagua and Jaen soybeans with more than 12 percent moisture were discounted at the rate of one-half percent for each one-half percent of moisture, at least up to 15 percent, as is indicated in the data. In this respect the producers were penalized as compared to the producers in the Tarapoto and Tingo Maria areas. For impurities the discounts were the same, but lots were purchased up to the [illegible]

The reason for the divergence from the limits set by the regulations is not known. The previous Resolucion Ministerial No. 0138-76-AL, dated March 10, 1976, set the limit of 16 percent moisture but with weight discounts beginning with moisture levels above 12 percent. The limit and discounts for impurities were the same as in the present regulations.

From the practical standpoint, a few lots of soybeans with higher levels of impurities can be blended with other lots of cleaner soybeans without problems. On the other hand, soybeans with high moisture levels, even though blended with lower moisture soybeans, will not be safe for storage. The 16 percent moisture level is too high for more than a very short-time storage of soybeans, especially in areas of high temperatures and high relative humidities.

A more fundamental concern is the purchase of a large proportion of soybeans with moisture levels less than 12 percent without a corresponding premium in price. This is a direct loss to the producers because of the loss of weight due to the loss of moisture and a direct gain to the processors in a greater output of oil and meal per unit of soybeans purchased.

Another concern in soybean marketing which is not evident from the data collected in this survey is the problem of discolored seedcoats and defective soybeans due to diseases and fungi. Discoloration of the seed coat is not necessarily an indicator of poor quality. The variety Jupiter naturally has a greenish hue, and purple spotted seed coats do not cause damage. The author has observed lots of soybeans rejected because of excessive defective soybeans but is not aware of the level of rejection or how determined.

Defective soybeans are most likely to be found in the areas which are subject to untimely and excessive rainfall during the harvesting and threshing periods. The removal of defective beans by hand is a time consuming task, and equipment is not available in the area to mechanize the process. A special cleaner, the Cleland Spiral Separator, is available in the U.S. which uses the principle of contrifugal force to separate the good beans from the bad. The good beans roll easily and move to the outside of the spiral, while the defective beans tend to stay near the center and are taken off separately at the bottom of the spiral.

RECOMMENDATIONS

1. In order to provide more equitable settlements between farmers and processors, it is recommended that changes be made in the regulations covering the purchase of soybeans. Attached is a copy of the recommendations of Mr. Paul Klinefelter, Consultant in Processing and Utilization of Soybeans, INTSOY, who visited Peru in late 1978 to study problems affecting the marketing and processing of beans. These recommendations, based on U.S. experience, set up standards for purchase and discount schedules that accurately reflect the loss in value of soybeans which are above the norms for moisture and impurities and for lots with defective beans. Also established is a discount schedule for lots containing excessive broken beans (greater than 15 percent).

Especially attractive is the schedule of premiums for soybeans of higher quality than the standards. These premiums reflect the added value of the higher quality beans to the processors. Premiums would be paid for soybeans down to 11 percent moisture and zero percent impurities. Soybeans carrying less than 11 percent moisture may need to be handled differently in the crushing process and may not have additional value due to greater processing costs.

2. Because of the problems of high moisture levels, excess impurities, and defective soybeans which are present in many areas of the selva (due to untimely and excessive rainfall), it is recommended that equipment be provided to dry and clean soybeans, when necessary, to improve the quality of the product and lengthen safe storage periods. For safe storage under high temperature and high relative humidity, soybeans should be dried to a 12-13 percent moisture level. Grain dryers which are available in many areas for rice production are suitable for drying beans.

Cleaners, including spiral cleaners for defective beans, would improve the quality of the lots and save much labor for the farmers.

A price schedule for cleaning and drying should be based on the costs of operation of the equipment. These costs would be deducted from the value of the purchase.

Accurate moisture meters to determine moisture levels, screening pans for determining percentage of impurities, and proper equipment to determine percentage of defective and damaged beans should be provided to all buying stations.

3. It is recommended that extension programs be developed to instruct and train both buying station personnel and producers.

A special short course should be developed for buying station personnel to train them in the proper operation of the equipment needed to establish the quality and determine discounts or premiums to be applied to each purchase. Special emphasis should be given to individual practice in using the equipment. Also, instruction and training should be given for the proper operation and adjustment of drying and cleaning equipment. Instruction in proper storage principles and practices is especially necessary when the soybeans need to be held for longer periods awaiting processing.

Extension programs for farmers need to be developed to meet the conditions prevailing in different areas. For the Bagua-Jaen area which experiences overdry soybeans, a program of management to avoid overdrying is needed. Possibly the best way to meet this is the cutting and stacking of the beans somewhat earlier when the beans still carry higher moisture levels. This practice would also tend to save beans lost by shattering and handling prior to the threshing operation. Once dry, it is difficult to increase moisture levels, especiall in semi-arid conditions.

For farmers in the Tarapoto-Tingo Maria and Satipo-San Ramon areas, emphasi needs to be given to ways of meeting the problems of untimely and excessive rai fall. Of great importance is planting at the proper time so that the harvest coincides with the normal dry periods of the year. Also important are storage areas with roofs to protect harvested beans from further rainfall and to facili tate drying which is difficult under high relative humidity. Proper drying fl to take advantage of the sun for drying are important. Finally, training in t operation and adjustment of the thresher will improve the efficiency of the operation and the quality of the product. For threshers, under Ministry or ot organizational supervision, which provide custom threshing services to produce it is recommended that a trained machine man be named to accompany and operate the thresher.

CONCLUSION

The analysis of the data regarding soybeans purchased by EPSA in 1978 indicated various problems of marketing experienced in the different areas of the high jungle. Additional data will be collected for the year 1979 to further define the problems and find solutions.

Several recommendations have been given to help alleviate the problems that have been identified in this survey.

1978: COMPARISON OF SOYBEAN PURCHASES MADE BY EPSA AT FOUR LOCATIONS, PERCENT MOISTURE, PERCENT IMPURITIES, WEIGHT OF PURCHASES AND DISCOUNTS

	TARAPOTO		TINGO MARIA		BAGUA		JAEN		TOTAL	
Percent Moisture	No.	%	No.	%	No.	%	No.	%	No.	%
7.1 - 8							1	-	1	-
8.1 - 9							13	6	13	2
9.1 - 10							36	17	36	7
10.1 - 11							45	21	45	8
11.1 - 12	1	1			122	78	53	25	176	33
12.1 - 13					28	18	50	23	78	14
13.1 - 14	65	43	1	5	5	3	14	7	85	16
14.1 - 15	37	25	2	11	1	1	2	1	42	8
15.1 - 16	47	31	16	84					63	12
TOTAL	150	100	19	100	156	100	214	100	539	100
Percent Impurities										
1% or less	4	3			2	1			6	1
1.1 - 2	8	5			14	9	3	1	25	5
2.1 - 3	27	18	2	11	74	47	33	15	136	25
3.1 - 4	50	33			44	28	125	59	219	40
4.1 - 5	21	14	5	26	14	9	39	18	79	15
5.1 - 6	40	27	12	63	1	1	10	5	63	12
6.1 - 7					3	2	3	1	6	1
7.1 - 8					4	3	1	1	5	1
TOTAL	150	100	19	100	156	100	214	100	539	100
Weight of Purchases (Kg)										
100 or less	27	19			1	1	1	1	29	5
101 - 500	66	44	4	21	8	5	35	16	113	21
501 - 1000	38	25	3	16	10	6	49	23	100	19
1001 - 2000	13	8	6	32	28	18	52	24	99	18
2001 - 3000	6	4	3	16	31	20	37	17	77	14
3001 - 4000			2	11	36	23	13	6	51	10
4001 - 5000					8	5	13	6	21	4
5001 - 6000					5	3	6	3	11	2
6001 - 7000					4	3	5	2	9	2
7001 - 8000					6	4	1	1	7	1
8001 - 9000					1	1	1	1	2	-
9001 -10,000			1	5	3	2			4	1
10,001 -15,000					9	6	1	1	10	2
Over 15,000					6	4			6	1
TOTAL	150	100	19	101	156	101	214	101	539	100
Purchases (Kgs)										
Gross Weight	77,039		35,555		631,415		406,195		1,150,204	
Discount for Moisture	755	1.0	467	1.3	1,403	.2	1,751	.4	4,376	.4
Discount for Impurities	850	1.0	268	.8	2,050	.3	1,643	.4	4,811	.4
Discount for Sacks	260	.4			4,871	.8	1,651	.4	6,782	.6
TOTAL DISCOUNTS	1,865	2.4	735	2.1	8,324	1.3	5,045	1.2	15,969	1.4
NET WEIGHT	75,174	97.6	34,820	97.9	623,091	98.7	401,150	98.8	1,134,235	98.6

RECOMMENDATION FOR MINISTERIAL RESOLUTION

No. 0482-77-AL

1. Price established by the Minister to be a "floor" and when higher prices are available open trading be allowed with all licensed buyers given authority to buy and sell; that all parties licensed to process oilseeds or to handle grain, including but not limited to EPSA and its agents, be so authorized to buy and sell.

   A. Location of origin should be a pricing factor other than just Coast-Selva.

   B. Change as per Article 13 should depend on oil, proteins, and fiber, considering the demand for the same, rather than on oil analysis only.

2. Premium price for better quality

   A. Fairer for farmer and processor.

   B. Encourage better product on the market.

   C. If method of testing has not been spelled out, this should be done.

   D. Soybean trade in a #1 soybean classification with the following schedule of discounts and premiums.

   #1 Soybeans: 13% Moisture; 4% Impurities; <.5% Damage

(a) Moisture (%)	Discount in Weight per 100 kg
13.	0
13.5	.66 1/
14.	1.33
14.5	2.5) Allows for drying expense
15.	3.5)
15.+Reject for drying by producer or negotiate price.	

(b) Impurities (%)	Discount in Weight per 100 kg
4	0
5	1.04 2/
6	2.08
6 +Reject for cleaning or negotiate price.	

1/ Hidden shrink, because lower percentage is based on smaller volume, thus 1.33 for each 1% reduction in moisture.

2/ Hidden loss in calculating impurities, because loss is figured on smaller volume, is 1.04 for each 1% change.

(c) Damaged Beans (%) 3/	Discount in Weight per 100 kg
<.5	0
.5 to 1.0	1.5
1.1 to 2.0	3.5
2.1 to 3.0	5.5
3.1 to 4.0	7.5
4.1 to 5.0	9.5
5.1 to 6.0	11.5
Over 6.0 Reject or negotiate price	
Musty or sour beans	10.0
Green beans, each 5%	.5

(d) Split Beans (%)	Discount in Weight per 100 kg
1 to 15	0
16 to 30	2
31 to 50	5
Over 50	10

(e) Moisture (%)	Premium in Weight per 100 kg
13	0
12.5	.66 1/
12	1.33
11.5	2.0
11.0 or under	2.33

(f) Impurities (%)	Premium in Weight per 100 kg
4	0
3	1.04 2/
2	2.08
1	3.12
0	4.16

3/ Purple hull does not denote damage and therefore there should be no additional discount for this. All beans offered should be accepted with explanation as to requirements for upgrading.

Adapted from Klinefelter Report, November 21, 1978
INTSOY/Peru
February, 1980