

November 5, 1964

RICE, WHEAT & SOY BEAN TRANSPORT & STORAGE - RIO GRANDE DO SUL

By Prof. H. K. Snell

The conclusions itemized in this report were based upon: (1) Observations in Rio Grande do Sul growing area; (2) Pôrto Alegre port and warehouse area; (3) Upon statistical data, provided by the Instituto Riograndense do Arroz (IRGA); (4) Conference with Dr. Burger, President of Banco de Desenvolvimento do Extremo Sul; (5) Conference and trips with officials of IRGA, especially Mr. Ary Herzog, "Assessor" - Statistician and principal assistant to the President; (6) Conference with officials of SAMRIG (S.A. Moinhos Riograndenses) and a visit to their soybean processing plant and storage facilities; (7) Conference with Mr. Jansen, port and shipping specialist for the World Bank, who had opportunity to analyze port facilities at Pôrto Alegre, Pelotas and Rio Grande; (8) Study of other available statistics in the EPEA Office and recent news material appearing in responsible public press.

Rice

1. The principal method of rice transport used to be by railroad and highway to Porto Alegre and Rio Grande and then by coastal vessel to other Brazilian ports or for world export.

2. Total cost of transport by truck is now (1964 and for the past several years) so much lower than truck-coastal vessel or railroad-coastal vessel that more than 70% of the rice - possibly almost 100% from interior growing and storage areas - now is transported to Brazilian markets by truck. Over-the-road trucks can haul a maximum of 30-35 tons, and the largest are low-sided trailers pulled by a "tractor". Most trucks are "single unit", often equipped with an extra axle at back end for more adequate weight distribution.

3. All rice is shipped in bags, dried, cleaned and milled rice in 60 Kg. size; undried rice between field and drier or mill, 50 Kg; same size sack can be used for both purposes.

4. All rice is stored in bags or sacks, at the drier, at the mill, in the warehouse at ports, at the storage warehouse at secondary markets, such as São Paulo. Between 18 million and 20 million bags are required per year just for rice, and a fairly high percentage can be reused. All sacks seen were made of sisal, grown in Brazil.

5. For any normal crop, storage capacity, both in the growing areas and in secondary areas, is adequate and is even excessive. IRGA's main warehouse in Pôrto Alegre was almost full on 20th October with 550,000 bags stacked as high as 15-20 meters. A commercial warehouse was rapidly being filled for IRGA account, with more than 150,000 bags already stored and as many as 20 trucks arriving daily. Four trucks were being unloaded, weighed, and samples being graded during my visit to both warehouses.

Most of the driers or drier-mills contained storage

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ESCRITÓRIO DE PESQUISA  
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(EPEA)  
Fm. 1336  
Data 09/08/67

space greater in area and cubic area than required for the milling machinery and handling, and thus constitute a major part of total storage space.

6. Some silos or bulk storage have been constructed, near Cachoeira do Sul, but time available and road surface conditions prevented my observation, although I was scheduled to visit them by IRGA car, accompanied by Mr. Herzog. Rain fell intermittently for 2-1/2 days and most of the roads are not asphalt surfaced.

7. Despite storage space availability and possible surplus of space, bulk storage and bulk transport are considered by IRGA officials as necessary and desirable to reduce costs, reduce frequency of handling, improve the process of drying, processing, grading and marketing.

Truck bodies could readily be converted to bulk transport, loading by chute or spout, unloading by inclining the truck body over a hopper, by lining the body with sheet plastic and making the tail-gate locking, or by a program of building new bodies of light sheet steel or heavy plywood about 1 meter in height, with a tight locking gate; the load, as under present conditions, to be covered by tarpaulin, plastic or canvas.

Most truck-hauled grain in U.S.A. is so handled. Most trucks observed in Rio Grande do Sul had bodies about 1/2 meter in height with railings or bars above and around the solid body and were usually built of wood with some space between the strips - therefore not grain-tight - good only for hauling sacked rice or grain and other packaged materials.

8. Judging from the statistics, rice distribution is well scattered throughout the months of the year. In 1964, from Rio Grande do Sul: (in sacks of 60 kg.) (Source: IRGA)

TABLE 1

January .....	441,200
February .....	577,939
March .....	104,776
April .....	245,924
May .....	264,240
June .....	253,887
July .....	388,439

In previous calendar years (most of IRGA statistics are kept by fiscal or growing year, which begins April 1 and ends March 31), a well defined trend is difficult to observe, since the months of peak shipment within the states of Brazil were as follows:

See Table 2 on next page.

Peak Months for Rice Shipment in Order of Rank

TABLE 2

Year	1	2	3	4	5	6	Total Sacks Shipped During Year
1954	June	July	May	Aug.	Oct.	Dec.	4,785,696
1955	May	Jan.	Sep.	Oct.	Apr.	June	4,925,493
1956	May	Aug.	Oct.	Nov.	June	Sep.	5,979,765
1957	Aug.	June	Jan.	Feb.	May	Sep.	4,967,804
1958	Oct.	Nov.	June	July	Sep.	May	6,180,386
1959	June	Oct.	May	July	Sep.	Aug.	5,485,478
1960	Aug.	Nov.	Oct.	May	Sep.	July	5,935,947
1961	Nov.	May	Jan.	Dec.	Oct.	June	4,619,725
1962	July	Jan.	Sep.	May	June	Mar.	6,769,156
1963	Oct.	Aug.	July	Apr.	May	Sep.	7,115,896

(Source: 19th Annual Statistics for Rice, IRGA, 1964, p. 99)

The peak month varied from a low of 443,905 in 1960 to a high of 1,157,583 in 1962, with average shipment per peak month for the 10-year period 1954-1963 of 750,000 sacks. If the two unusually high years of 1962 and 1963 are not considered, the average for the peak month is 671,000 sacks for the 8-year period. The month of second rank averages 620,000; for the third rank 579,000; for fourth rank 533,000.

A brief article entitled "Arroz Graxoso" in "O Jornal" of 4th November 1964, p. 4, mentioned the large surplus of rice in storage in Rio Grande do Sul as of this date and stated, in essence, that the total cost of production is so great that the crop cannot compete either on the export world market or on the Brazilian market. IRGA was reported as requesting subsidy funds from the federal agencies in order to move the crop. Federal and IRGA policy was blamed in encouraging uneconomic production. This condition in part explains why warehouses bulging with rice were observed in Porto Alegre and vicinity although seeding for the new crop was in progress and October is almost six months past the harvest season.

TABLE 3

Rio Grande do Sul Monthly Exports of Husked Rice - Years 1954/63

Months	1954	1955	1956	1957	1958	S T A T E S
January	233,718	472,371	294,627	487,634	348,579	
February	129,120	283,597	389,786	455,766	213,548	
March	143,552	215,384	370,279	222,920	347,415	
April	351,805	447,121	384,426	230,883	449,417	
May	523,513	672,262	779,993	425,523	588,021	
June	615,720	441,447	556,297	370,732	671,204	
July	549,213	405,241	532,470	562,817	633,716	
August	495,292	359,270	596,960	792,595	539,184	
September	437,539	458,859	537,489	374,350	607,128	
October	471,755	451,995	567,687	321,079	722,733	
November	393,093	419,565	563,380	360,374	692,056	
December	441,376	298,381	406,371	363,131	367,385	
TOTAL	4,785,696	4,925,493	5,979,765	4,967,804	6,180,386	

In Sacks of 60 Kg.



Months	<u>1 9 5 9</u>	<u>1 9 6 0</u>	<u>1 9 6 1</u>	<u>1 9 6 2</u>	<u>1 9 6 3</u>
<u>S T A T E S</u>					
January	456,592	229,419	458,777	894,483	391,241
February	169,414	191,149	164,267	322,687	409,101
March	174,023	164,156	373,674	488,858	453,151
April	449,988	311,664	400,253	444,993	716,689
May	574,919	400,581	591,545	591,758	677,709
June	685,532	273,559	435,672	518,260	462,443
July	560,885	357,770	254,481	1,157,583	750,649
August	534,982	443,905	151,734	470,619	759,029
September	554,322	367,609	227,242	863,441	621,846
October	641,192	432,356	455,590	434,595	979,214
November	412,445	439,391	656,644	352,205	580,588
December	217,184	324,388	449,846	229,674	314,236
<b>TOTAL</b>	<b>5,485,478</b>	<b>3,935,947</b>	<b>4,619,725</b>	<b>6,769,156</b>	<b>7,115,896</b>

(Source: 19th Annual Statistics for Rice, IRGA, 1964, p.99)

9. Because of variability of production of an agricultural commodity, such as rice, the amount available for foreign export was greatly different from year to year. No export from Rio Grande do Sul was recorded in 1954 or 1963, almost none in 1955, 1957, or 1960.

In 1956, foreign export totalled 1,670,000 sacks of 60 kg. each; in 1958 the amount was 646,136 with some of the same crop being dispatched in January 1959 to the amount of 382,354 sacks.

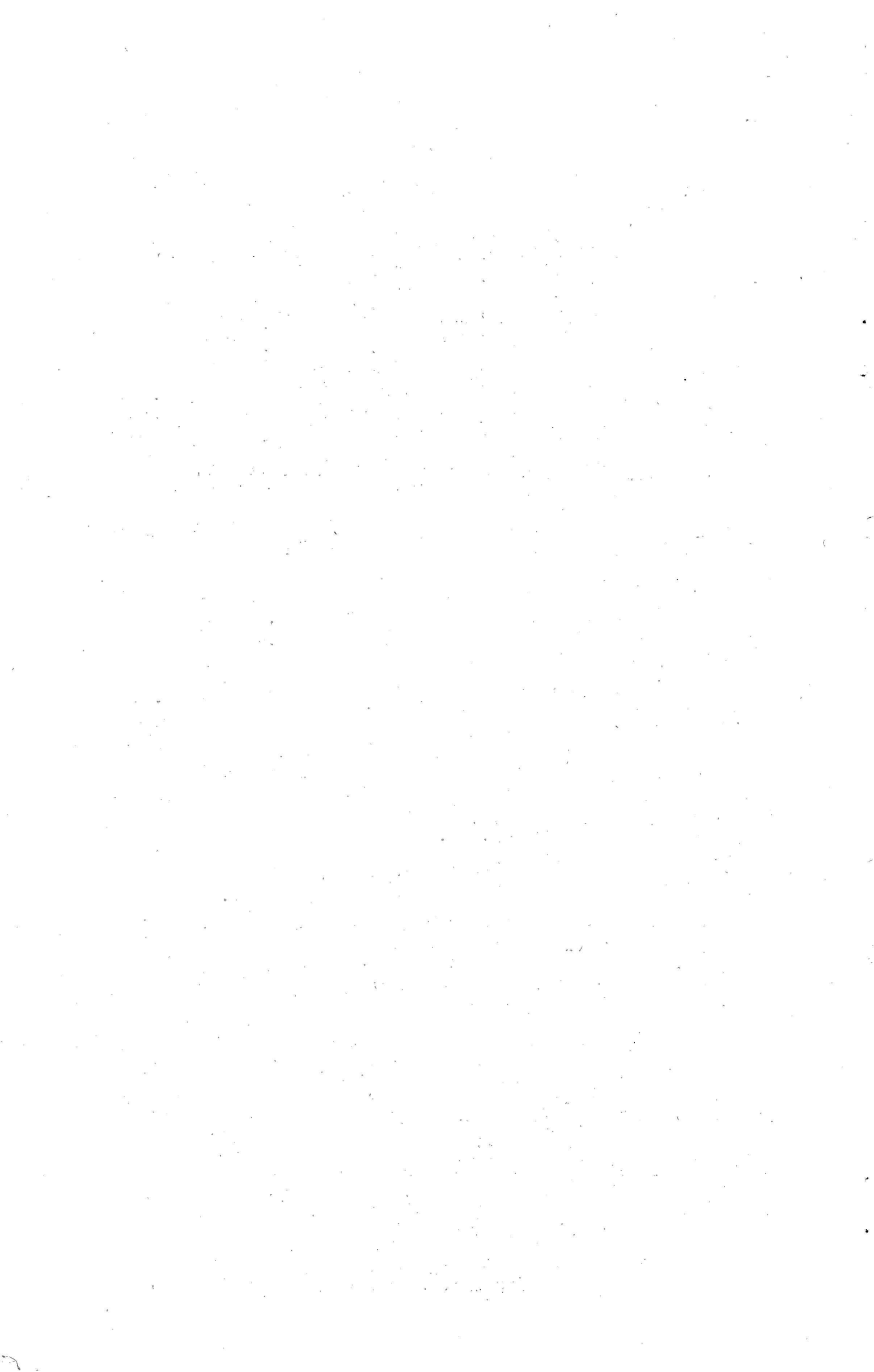
The year 1961, while not an unusually productive year in total, did move 2,430,189 bags to the foreign market, the principal distinctions being French Africa 243,424 sacks, Colombia 133,333, Belgium 215,030, Czechoslovakia 169,529 and especially Indonesia 1,379,360.

For export purposes, rice moves from Rio Grande do Sul warehouses in sacks almost entirely by truck to the port of Rio Grande and is there loaded on ocean freighters.

10. Rice production in Rio Grande do Sul is concentrated in the lower altitude areas (Source: map, Plate 10, Plano Rodoviário, Estado do Rio Grande do Sul, Departamento Estadual de Portos, Rios e Canais, 1961, and map, p.6, Localização da Área Cultivada com Arroz no Rio Grande do Sul, 19th Annual Statistics for Rice, 1964, IRGA):

Immediately south and southwest of Porto Alegre, along the flat coastal plain on the shores of Lagoa dos Patos, south and southwest of Pelotas and Rio Grande to the Uruguayan boundary; westward from Porto Alegre in the valley of the Rio Ibicui and its associated rivers; and along the bank of the Rio Uruguai, southwest from São Borja and Itaqui to the southwest corner of the State.

11. a) Estimated transit time by trucks from the interior to a major market such as São Paulo is from 2-4 days, 3-5 to Rio de Janeiro.
- b) By truck and coastal vessel from Porto Alegre to Rio de Janeiro, a minimum of 10-14 days,



often more, with at least 6 handlings and usually more, field or primary warehouse to secondary market warehouse, compared with one handling all the way by truck.

- c) Transit time by rail, e.g. Cachoeira do Sul to São Paulo, at least 8-10 days and usually much longer. Rice would not be shipped to Rio de Janeiro by rail because of change of gauge precludes interchange from one rail line to the other.

12. In a Table entitled "Estimativa do Custo de uma Quadra de Arroz (19<sup>o</sup> Anuário Estatístico do Arroz, IRGA, 1964, p. 98) including 12 major elements of cost, shown for the years 1959/1960 to 1963/1964 inclusive, transportation "para trilha-deira, secador e engenho secagem", declined in percentage of total cost from 10.2% in 1959/1960 to 6.7% in 1963/1964. In cruzeiros, transport cost increased from 5,000 to 26,760 during the same period; total cost increased from 49,000 to 399,000. (The "quadra" is probably a unit of land area, defined in the dictionary as 17,424 sq. m. or about 4 + acres).

13. Channel depths on the Lagoa dos Patos are 6 m. minimum, hence ocean freighters can be loaded to no more than 3,000 tons at Porto Alegre. From Rio Grande port, 10,000 tons can be loaded; according to IRGA, it therefore is their practice to send all of their rice through Rio Grande.

According to APEC, "Análise e Perspectiva Econômica, 1964", APEC Editora S.A., Table C-7, supposedly in tons (the table notation does not state the units), the three Rio Grande do Sul ports handled the following in 1962.

TABLE 4

<u>All Commodities</u>	<u>Long Distance Exports</u>	<u>Coastwise Exports</u>	<u>Total Exports</u>
Porto Alegre	161,073	321,509	482,582
Pelotas	-	46,150	46,150
Rio Grande	255,678	1,031,377	1,287,055

<u>All Commodities</u>	<u>Long Distance Imports</u>	<u>Coastwise Imports</u>	<u>Total Imports</u>
Porto Alegre	451,941	2,097,237	2,549,178
Pelotas	32,436	52,844	85,280
Rio Grande	614,216	803,625	1,417,841

<u>All Commodities</u>	<u>Total Imports &amp; Exports</u>
Porto Alegre	3,031,760
Pelotas	131,430
Rio Grande	2,704,896

A considerable proportion of total "imports" for Porto Alegre is petroleum products, carried from Rio Grande tank storage to a point closer to major consuming market. Many of the vessels observed in the harbor of Porto Alegre were small tankers, traversing the Lagoa dos Patos and its associated channels, and originating at Rio Grande.

14. Rio Grande do Sul produces the following agricultural commodities, in order of reported tonnage, in 1962:

TABLE 5

Corn .....	1,808,229
Manioc .....	1,483,689
Sugar cane .....	988,124
Wild manioc .....	900,287
Rice .....	888,308
Wheat .....	513,691
Sweet potatoes .....	292,891
Potatoes .....	282,215
Grapes .....	263,720
Soy beans .....	239,060
Beans .....	164,049
Alfalfa .....	129,145
Onions .....	106,231
Tobacco .....	63,886
Flax .....	40,248
Barley .....	23,379
Oats .....	18,321

All others listed were in tonnages less than 10,000 each.

Source: 19<sup>o</sup> Anuário Estatístico do Arroz, 1964, IRGA, p.106

15. (a) According to an interview with Dr. Burger, cotton and paper sacks used for transport of fertilizer for agricultural production in Rio Grande do Sul cost an average of Cr\$15,000 (1964 prices) "per ton of product", much of which could be eliminated if bulk handling methods are adopted.
- (b) Charter rates on foreign vessels transporting fertilizer as of 1964, from Africa have been \$6-\$8 per ton, or about one half of the rate on Brazilian vessels from Recife to the same ports in Rio Grande do Sul.
- (c) Foreign exchange arrangements for fertilizer importation have been so sporadic and irregular that total cost has been increased by unnecessary storage charges, caused by large quantities received on occasion and stored some months until shipping into the interior. A more even flow would be less costly.
- (d) All fertilizer is moved to the interior in bags and sacks, but whether delivered to ports in bulk or in sacks was not made clear.

16. Rice is sacked after drying in the fields, if cut by hand, or directly from the harvesting machine, taken to the drier or mill in sacks; sacks are emptied, of course, for any mechanical drying, hulling, milling or mixing, resacked for storage, transported from warehouse to warehouse in sacks, and in the same containers to the wholesaler before distribution to the retailer.

Despite these numerous handlings in bagged form, loss from damage or insects or rodents is estimated at not more than 1%.

17. According to the Anuário Estatístico do Arroz, 1962, IRGA, p. 99, Rio Grande do Sul rice was dispatched to the principal domestic consuming markets as follows, for a 5-year period: (In thousands of sacks, 60 kg. per sack).

TABLE 6  
Rice Processed for Domestic Distribution

<u>Year</u>	<u>1957/58</u>	<u>1958/59</u>	<u>1959/60</u>	<u>1960/61</u>	<u>1961/62</u>
Total processed	4,711	6,071	5,270	4,027	4,962
Total to São Paulo	1,476	1,789	1,395	573	1,085
% of total to São Paulo	31.2	29.1	26.4	14.2	22.0
Total to Guanabara	2,294	3,166	2,737	2,461	2,399
% of total to Guanabara	48.7	52.0	52.0	61.1	48.3

The conclusion may be reached that São Paulo, with a population about the same as Rio de Janeiro (Guanabara) must obtain rice from other sources, assuming consumption per capita is about the same in both areas.

Possibly, without any investigation being directed to the consuming markets upon which to base a conclusion, Rio de Janeiro receives much of the rice shipped by ocean transport. These data are worthy of more analysis. Also, Guanabara produces no rice, São Paulo State does, ranking third in 1962; Rio de Janeiro is listed, however, as eighth in production in 1961, as shown in Table 7.

18. The IRGA publication referred to above, 19th Ed., p. 106, reports "Produção Estimada" for rice by Brazilian State for 1961 and 1962:

TABLE 7  
Production Estimates In Tons

	<u>1 9 6 1</u>	<u>1 9 6 2</u>
1. Rio Grande do Sul	1,090,099	1,169,798
2. Minas Gerais	928,885	921,155
3. São Paulo	915,553	865,012
4. Goiás	762,380	838,005
5. Maranhão	491,500	558,213
6. Paraná	308,728	335,273
7. Mato Grosso	262,056	254,684
8. Rio de Janeiro	119,400	106,660
9. Piauí	68,795	70,997
10. Ceará	64,256	77,923
11. Espírito Santo	46,523	47,819
12. Pará	40,431	39,422

All other states produced less than 40,000 tons each.

Total Brazilian production is estimated for 1961 as 5,392,377 tons; and for 1962 as 5,556,834 tons.

## Soybeans

19. There is no transport or storage problem for soybeans, in Rio Grande do Sul, except that responsible officials would prefer storage and transport in bulk. Some 99% is moved in sacks to warehouses and to the mill near Porto Alegre.

70% of total soya received at the mill is by truck, 30% by rail. As sacks are unloaded from car or truck, the sewing or stitching at one end of the bag is cut by hand-held knife and the contents dumped a sack at a time into a grating-covered hopper, from which receiver it is conveyed mechanically to vertical silos. SAMRIG has 12 silos; each can hold 1250 tons, or a total of 15,000 tons. At present rate of consumption this is sufficient for about 55 days' operations; at designed capacity of 400 tons daily, enough for about 37 days.

During my visit on October 22nd, only enough soya was in storage for one month's processing. If more can not be obtained, or crude soy oil can not be imported, the plant will close down in December.

Soy bean production is declining, although land area devoted to soya is increasing. The problem is a genetic one, and not one of transportation. Quality of seed is declining, no new strains or improved seed are being developed or introduced, no experimentation in seed quality, growing methods, soil analysis, is being done. Quality of soya received at the mill continues to decline.

The gloomy conclusion of the two company officials is that unless all parts of the industry, miller, transporter, warehouse, and grower, with some aid from appropriate federal and state government organizations, do not promptly cooperate to solve these problems, the soy bean industry as such will degenerate to futility and possible extinction.

Some such organized effort as IRGA for rice is recommended by the SAMRIG officials. The Porto Alegre plant can process peanuts or crude peanut oil.

## Wheat

20. Wheat (trigo) is produced widely throughout the state, but seems to be consumed almost entirely locally, and milled in local mills. The elevators and silos on the Porto Alegre waterfront were chiefly for imported wheat and grain.

21. Corn production is widely dispersed, especially to the north of the main river valleys. Consumption is all local, going into animal feed. There are no transport problems.

22. An article entitled "Quando o IRGA Pode Entrar no Mercado Vendedor" (When IRGA - Rice Agency for Rio Grande do Sul - Enters the Selling Market), by Ary Herzog, (official of IRGA and my guide for several days at Porto Alegre) appeared in the publication "Lavoura Arrozeira", August 1964, pp. 38-40. The article explains that to keep a good price for the grower, IRGA must be prepared to buy practically all the rice in Rio Grande do Sul and finance such purchase through the



Banco do Brasil, sometimes holding the supply in warehouses for months. This process is necessary but adds to the cost. The explanation ends with a tabular presentation entitled:

TABLE 8

Expenses incurred in shipping 10,000 sacks of rice to Rio de Janeiro, Nov. 1963. Amounts in cruzeiros

On Bill of Lading

Freight .....	4,179,692.10
Merchant Marine Renewal Tax .....	626,953.80
Additional .....	334,375.40
Maritime security - insurance .....	250,781.50
Use of Port: loading .....	126,459.50
Use of Port: unloading .....	143,087.60
Port security .....	97,087.00
Stevedoring: ship hull .....	390,395.40
Stevedoring: along side .....	731,558.80
Checking: ship hull .....	62,326.80
Checking: along side .....	155,989.00
Customs fees .....	604.00
Additional (Resolution 1578) .....	944,046.00
Miscellaneous fees .....	15.00
	<u>8,043,371.90</u>

On Export Form

Fiscal Bureau	
Sales & Consignment tax .....	4,740,000.00
Other taxes .....	600.00
	<u>4,740,600.00</u>

Port Bureau	
Dock-use fees .....	78,520.00
Additional (556.88%) .....	437,262.00
Social Security .....	41,262.60
Port Improvement tax .....	158,000.00
	<u>715,044.80</u>

13,499,016.70

For 10,000 sacks, this cost is Cr\$1350 per sack, or Cr\$22.5 per kg.

Taxes seem to be about Cr\$6,844,637 total, or Cr\$684.46 per sack, or Cr\$11.4 per kg, about half of "Expenses".

In connection with this comment on taxes, the explanation by a staff member of the Getulio Vargas Foundation may be of interest, in showing possible impact of taxes on rice.

- 1) When a small producer sells to the rice mill, there is no tax on this transaction.
- 2) When the mill sells rice to IRGA, the mill pays a tax on the transaction.
- 3) When IRGA sells rice to a wholesaler, e.g. in Rio de Janeiro, IRGA pays a transaction's tax.

- 4) If the wholesaler then sells rice to a retailer, the wholesaler pays a tax on the transaction.
- 5) On the final sale to the consumer there is no tax, but the price should by this time reflect a tax of at least 30%, or major part of such a percentage. It could be higher than 30%.

The same economist for the Foundation stated during the interview that in order to get an income, rice growers often sell their entire crop, saving out none for seed, then must come into the market at planting time, buy seed at consumer market prices, and ship it all the way back to the farm, sometimes hundreds of kilometers. Such a practice adds unduly to costs and strain on the transport system.

23. In the conference with Dr. Burger, he suggested additional conclusions relative to rice and other agricultural commodities:

- a) A principal need of the rice industry especially, would be what he called "dehydration cards" or, if my interpretation is correct, a standardized indication of grading to determine weight loss in the rice drying and cleaning process, change in grade, and complete standardization of the process of drying, cleaning and grading for market.
- b) He strongly recommends a process which he calls "warranting or what is called in America "use of warehouse receipts" as a means of financing the warehouseman by permitting his goods to be covered by a negotiable financial instrument which can be discounted and handled by suitable banking processes. This would enable him to turn his capital readily, quickly, and at a reasonable financing rate.

Dr. Burger explained some of the process by which deposits in the Bank of Brazil are "sterilized" as reserves. If my notes are correct, some 14% of term deposits are thus "sterilized" plus 20% of call deposits. If the warehouse receipt should be adopted, the Government could release part of these reserves to finance crops and thus aid in production, transport and marketing. Dr. Burger believes that local steps will have to be created for such financing.

- c) Dr. Burger thinks that bulk handling transport methods are necessary for the principal agricultural commodities where feasible in order to reduce cost, speed up handling and obtain greater uniformity of product.

24. As an indication of storage area available along the waterfront and apparently as part of port facilities, Porto Alegre in 1962 was listed as having warehouse area of 46,213 sq. m., 3 wheat silos with 17,200 tons capacity, and one refrigerated warehouse with 1,300 tons capacity; Pelotas has 4 "internal" warehouses and two wheat silos of 5,200 tons; Rio Grande supposedly has 23 "internal" warehouses. Rio Grande also has 76 tanks with 145,800 tons listed capacity.

25. My conclusion is that the rice production-distribution problem contains more elements requiring improved marketing and financing techniques than transportation methods, which could well be the subject of additional research. The principal transport problems appear to be:

- 1) The 1964 cost and inadequacy of coastal and water transport;
- 2) The lack of bulk shipping and storage;
- 3) Too frequent handling during the entire distribution and marketing process.

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