A Note on the Edible Oil Milling Sector Output, Value Added and Employment

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The importance of the edible oil industry cannot be over-emphasised. Most of the urban population and an increasing proportion of the rural population depend upon it for their cooking needs. As indigenous supplies are highly inadequate, large quantities of edible oils have to be imported to meet domestic requirements, as shown in Table 1.

Table 1

Imports of Edible Oils (000 tons)

Year	Quantity
1970-71	81
1971-72	69
1972-73	70
1973-74	167
1974-75	194

Source: [5].

It is estimated that if the trends shown in table 1 would continue, the deficit in domestic supplies could increase from about 200 thousand tons in 1974-75 to about 380 thousand tons by 1979-80 and about 545 thousand tons by 1984-85 [9].

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Very little reliable data exist on the domestic production of edible oil. Better systems of data collection are badly needed and must be developed. In the meantime this paper presents the results of an attempt to estimate the output, value-added, and employment of the edible oil milling sector, over a number of years, using whatever data are at present available, in order to have a clearer statistical picture of the industry.

The four techniques used for edible oilseed processing in Pakistan are:

(*i*) *Kohlus* or *ghanis*,

(*ii*) Low pressure expellers,

(*iii*) High pressure expellers (but used only at low pressure[1]), and

(*iv*) Solvent extraction.

The first three techniques may for convenience be defined as constituting the oil milling sector, as distinct from the fourth which is a capital intensive chemical process (see Appendix A). The raw material from which oil is extracted consists mainly of cottonseed, rapeseed and mustard, and sesame (sesamum) Though groundnuts are also grown on a commercial scale, oil extraction from them is not economically feasible because of the large opportunity cost involved (see Appendix C). Cottonseed can only be crushed by expellers which are equipped with steam units necessary to soften the seed before it can be crushed, whereas rapeseed and mustard and sesame are crushed by both *kohlus* and expellers.

REVIEW OF DATA

The basic data for total agricultural production of the oilseeds used in this paper is taken from the Agricultural Statistics of Pakistan 1975 [5]. Crop production is computed in the following manner:

$$\text{Production} = \text{crop area} \times \text{normal yield} \times \text{seasonal condition.}$$

The *patwaris* record the acreage under each crop for the revenue records each season. These records are fairly reliable as the acreage in each area has been mapped and surveyed. The normal yield is defined as the average yield in a five-year period as determined by official crop cutting experiments. The seasonal condition factor is subjectively measured by revenue and agricultural officials and is an index relating the current year yield to the historical average for the area. Note that:

- The last two variables in the above formula are statistically unreliable. Random surveys have established that true yields are significantly different from official estimates. The results of these surveys indicate that official yields consistently under or over estimate yields by 10-15 percent. In a season of poor crop official figures over estimate and in favourable years tend to under-estimate production [4].

[1]See Appendix A.

From the figure for total seed production, the statisticians of the Planning Unit Ministry of Food and Agriculture, subtract the amount for seed and feed and assume that the rest is used in the manufacture of edible oil. The ratios of total seed assumed for oil manufacture are: cottonseed 68 percent, rapeseed and mustard 92 percent, sesame 93 percent, and groundnut 75 percent.[2] The ratios for cottonseed, rapeseed, and even sesame that go into manufacture may be accepted though a fair proportion of sesame seed goes into confectionary. The figures for groundnut are not acceptable (see Appendix C).

In this paper the figures for seed used in manufacture are combined with the output, value-added, and employment ratios taken from the Basic Statistics on Small and Household Manufacturing Establishments, [10], published by the West Pakistan Small Industries Survey Organization. This survey provides statistics on a very representative sample of this sector. It covers 478 oil milling units, 312 small industries and 166 household units (category 20910 of the survey). It provides data on value of raw material, value of output, value-added, and employment for both *kohlus* (household) and expellers (small scale) and, in aggregate, for a sample of the oil milling sector (small-scale and household).

To check the validity of the statistics of the survey, 6 expeller and *kohlu* units in different parts of Rawalpindi were surveyed by the author. Results from the survey confirm that there has been no technological improvement in the methods used for oil extraction. Results further justify the assumption that both *kohlus* and expellers bear constant input-output and input-employment ratios over time (the ratios not having changed over the ten-year period from 1966, the year of the WPSISO survey, to 1976 the year these statistics were checked out).

METHODOLOGY

This paper is based on the following assumptions:

(1) There has been no technological change in the oil milling sector in both expellers and *kohlus* on an aggregate. It is assumed that the superior extraction rates of a new machine are offset by reduced efficiency in older machines.

(2) The input-output ratio, input-value-added ratio, and input-employment ratio are constant.

(3) All the seed that goes into edible oil manufacture is processed by the oil milling sector (see Appendix A).

The figures for quantities of oilseeds used in manufacture from 1947 to 1975 were valued in constant prices by using weighted average 1966 prices for each crop. This was done to bring these series on the same base as the ratios taken from the survey of the oil milling sector which was conducted in 1966.

[2]The Planning Unit, Ministry of Food and Agriculture also publishes oil production data by applying the following oil extraction ratios to the seed in manufacture; rapeseed and mustard 34 percent, cottonseed 10.2 percent sesame 40 percent and groundnut 40 percent to arrive at oil production figures. The extraction rates for rapeseed, sesame, and groundnut if they were crushed, are too high while the cottonseed extraction rate may be accepted as an approximation only.

For cottonseed, which can be processed only by expellers, (and not by *kohlus*) expeller ratios of value of output to value of raw material, value-added to value of raw material, and employment to value of raw material, taken from the survey of the oil milling sector described in the previous section, were multiplied respectively by the value of cottonseed used in manufacture to get value of output, value-added, and employment generated by cottonseed processing. Cottonseed is by far the most important domestic source of edible oil making up about 70 percent by value of the raw material used in edible oil manufacture.

For rapeseed mustard, and sesamum, since these are processed by both expellers and *kohlus*, the value of each of these oilseeds respectively were added for each year and the resultant series multiplied respectively by the aggregate ratios (expeller and *kohlus* combined) of value of ouput to value of raw material, value-added to value of raw material, and employment to value of raw material, to get the value of output, value added, and employment generated by the processing of rapeseed and mustard, and sesamum. Total value of output, value added, and employment for the entire oil milling sector were obtained by adding the respective figures obtained from cottonseed, and rapeseed and mustard processing for each year.

The three ratios of value of output to value of raw material, value-added to value of raw material, and employment to value of raw material, for expellers alone (cottonseed crushing) and for expellers and *kohlus* in aggregate (for rapeseed and mustard, and sesamum crushing) obtained from the sample survey are given in Table 2. In general the product of r_i and the value of raw material would give us the value of output, value added, or employment depending upon the value of r_i.

Table 2

Ratios of Value of Output, Value Added and Employment to Value of Raw Material

For Cottonseed (from expellers only)			For rapeseed and Mustard, and sesamum seed (from expellers and *kohlus* combined)		
Value of output	Value added	Employment	Value of output	Value added	Employment
r_1	r_2	r_3	r_{1a}	r_{2a}	r_{3a}
1.1859	0.1684	0.0340	1.1943	0.17938	0.03725

Source: [10] .

Total value of output, value-added, and employment for the entire edible oil milling sector were obtained by adding the respective figures for cottonseed, and rapeseed and mustard and sesamum seed, i.e.:

1. $VO_T = VO_C + VO_{RS}$
2. $VA_T = VA_C + VA_{RS}$
3. $E_T = E_C + E_{RS}$

The symbols VO, VA, and E, represent value of output, value-added, and employment, respectively, and the subscripts T, C, and RS, are for total, cottonseed, and rapeseed mustard and sesamum, respectively.

It will be noted that since the series is in 1966 constant prices, we can calculate the growth rates in total value of output as a proxy for the growth in total physical output.

RESULTS

Table 3 is based on the total edible oilseed production in the country and the proportion that goes into edible oil manufacture. Table 4 gives the value of output, value-added, and employment generated from cottonseed expelling. Table 5 shows the value of output, value-added, and employment generated from rapeseed and mustard, and sesamum expelling. Table 6 presents the total value of output, value-added, and employment of the entire oil milling sector.

The results indicate that the output of this sector grew at a rate of 3.5 percent over the 28 years from 1947-48 to 1974-75. However, if five-year periods are taken, the growth rates are: 2.9 percent for 1959-60 to 1964-65, 5.7 percent for 1964-65 to 1969-70, and 2.1 percent for 1969-70 to 1974-75. The fluctuations in growth rates may be attributed to fluctuations in the availability of raw material.

In recent years the Government has fixed the price of cottonseed oil at Rs. 200 per maund and, due to the substitutable nature of edible oils, the prices of the other edible oils cannot vary very much above Rs. 200 per maund. This makes it difficult for the oil milling sector to cover costs, etc. This squeeze is transmitted to the agriculture sector which supplies the raw material. Due to the unattractive prices of oilseeds, farmers only grow them on marginal lands. Yields are poor, acreage is limited, and hence the availability of raw materials is static and inadequate. This is the main reason for the oil milling industry not keeping pace with the growth in domestic demand.

Note that our estimates of the value of output, value-added, and employment could be slightly biased in regards to rapeseed and mustard, and sesamum processing. These make up about 30 percent by value of the raw material that goes into oil milling. The estimates presented above could be improved if we know how much rapeseed and mustard, and sesamum goes into expellers and how much goes into *kohlus*. There is a substantial difference between the techniques in the extraction rates, value-added, and employment. The expellers have

Table 3

Total Seed Production and Total Seed in Manufacture

('000' tons)

Years	Total seed Production			Total seed in Manufacture		
	Cottonseed	Rapeseed	Sesamum	Cottonseed	Rapeseed	Sesamum
1947-48	387	172	9	263	117	8
1948-49	337	185	6	224	170	6
1949-50	433	142	6	294	131	6
1950-51	492	196	8	334	180	7
1951-52	489	197	7	332	181	6
1952-53	625	125	6	425	115	6
1953-54	499	163	6	339	150	6
1954-55	554	216	6	376	199	6
1955-56	587	218	6	399	201	6
1956-57	599	222	6	407	204	6
1957-58	598	229	6	407	211	6
1958-59	555	262	6	377	241	6
1959-60	574	235	8	390	216	7
1960-61	593	211	7	403	194	6
1961-62	638	202	11	434	186	10
1962-63	721	253	8	490	233	7
1963-64	824	208	8	560	191	7
1964-65	743	211	9	505	194	8
1965-66	816	179	7	555	165	6
1966-67	912	200	7	620	184	6
1967-68	1018	270	9	692	248	8
1968-69	1038	225	8	706	207	7
1969-70	1054	251	8	717	231	7
1970-71	1068	156	10	726	244	9
1971-72	1393	296	13	947	272	12
1972-73	1381	282	10	939	259	9
1973-74	1296	288	12	881	265	11
1974-75	1248	244	8	849	224	7

Source: Columns: 2, 3, 4 from [5] columns 4, 5 and 6 calculated using planning unit Ministry of Agriculture, ratios.

Table 4

Value of Raw Material, Value of output, Value-added and Employment for Cotton Seed Expelling

(Value in '000' Rs. Employment in man years)

Years	Value of Raw Material (V.R.M)	Value of output ($r_1 \times$ V.R.M.) $(VO)_C$	Value-added ($r_2 \times$ V.R.M) $(VA)_C$	Employment ($r_3 \times$ V.R.M) $(E)_C$
1947-48	182467	216406	30654	6204
1948-49	155426	184335	26112	5284
1949-50	204156	242129	34298	6941
1950-51	231919	275036	38962	6885
1951-52	230559	273443	38734	7839
1952-53	294682	349495	49507	10019
1953-54	235274	279035	39526	7058
1954-55	260790	309297	43183	7823
1955-56	276765	328244	46497	8303
1956-57	282523	334954	47447	8473
1957-58	281952	334395	47368	8459
1958-59	261678	310350	43962	7850
1959-60	270552	320874	45467	1819
1960-61	279594	331599	46972	8388
1961-62	300811	356762	50536	9024
1962-63	339945	403175	57111	10198
1963-64	388509	467702	65270	11655
1964-65	350318	415477	58853	10510
1965-66	384737	456298	64636	11542
1966-67	430000	509980	72240	12900
1967-68	479978	569254	80636	14399
1968-69	489408	580438	82171	14682
1969-70	496952	589385	83488	14908
1970-71	503553	597214	84597	15106
1971-72	656788	778950	110340	19704
1972-73	651130	772240	109390	19534
1973-74	611058	724709	102657	18332
1974-75	588421	697868	98855	17653

Price = Rs. 693 per ton for Cotton Seed calculated from [3].

Table 5

Value of Raw Material, Value of output, Value-added and Employment for Rapeseed, Mustard, and Sesamum Expelling

Year	Value of raw material Rapeseed and Mustard	Value of raw material Sesame	Total value of raw material (1+2) (V.R.M)	Value of output (r_{1a}×V.R.M) $(VO)_{RS}$	Value-added (r_{2a}×V.R.M) $(VA)_{RS}$	Employment (r_{3a}×V.R.M) $(E)_{RS}$
1947-48	126946	15373	142324	169978	25530	5302
1948-49	184732	10242	194984	232869	34976	7263
1949-50	141794	10252	152046	181588	27274	5664
1950-51	195716	13669	209385	250068	37559	7800
1951-52	106716	11960	208675	249220	37432	7773
1952-53	124819	10252	135071	161515	24229	5031
1953-54	162438	10252	172690	206244	30977	6433
1954-55	215687	10252	225939	269839	40259	8416
1955-56	217684	10252	227936	272224	40887	8491
1956-57	221678	10252	231930	276996	41604	8639
1957-58	2288396	10252	238648	285017	42890	8890
1958-59	261620	10252	271872	324697	48768	10127
1959-60	234659	13669	248328	296579	44545	9250
1960-61	210694	11960	222654	265916	39940	8294
1961-62	201707	18795	220502	263346	39940	8214
1962-63	252633	13669	266302	318045	47769	9920
1963-64	207698	13669	221368	264379	39709	8246
1964-65	210694	15378	226072	269998	40553	8421
1965-66	178740	11960	190701	227754	34208	7104
1966-67	199710	11960	211670	252798	37969	7885
1967-68	269608	15378	284986	340359	51121	10166
1968-69	224674	13669	238343	284633	42754	8878
1969-70	250636	13669	244305	315670	47411	9845
1970-71	373154	17086	390240	466064	70001	14536
1971-72	295571	22213	317783	379529	57004	11837
1972-73	281519	17086	298678	356711	53577	11126
1973-74	287582	20504	308086	367947	55264	11476
1974-75	243646	13669	257315	307312	46157	9585

Notes: Column (1) Average Price: Rs. 1085/Per ton
(2) Average Price: Rs. 1837/Per ton calculated from [3].

Table 6

Value of output, Value-added and Employment for Oil Milling Sector

(Value in '000' Rs. Employment in man years)

Year	Rapeseed and Sesamum			Cotton Seed			Total		
	Value of output $(V.O)_{RS}$	Value added $(V.A)_{RS}$	Employment $(E)_{RS}$	Value of output $(V.O)_C$	Value added $(V.A)_C$	Employment $(E)_C$	Value of output $(V.O)_T$	Value added $(V.A)_T$	Employment $(E)_T$
1947-48	169978	25530	5302	216406	30654	6204	386383	56185	11505
1948-49	23289	34977	7263	184335	26112	5284	417204	61089	12548
1949-50	18588	27274	5664	242129	34298	6941	423717	61572	12605
1950-51	250068	37559	7800	275056	38962	7885	525125	76522	15685
1951-52	249220	37432	7773	273443	38734	7839	522663	76166	15612
1952-53	161315	24229	5031	349493	49507	10019	510808	73736	15051
1953-54	206244	30977	6432	279035	39526	7058	485279	70503	13491
1954-55	269839	40529	8416	309297	43813	7824	579136	84342	16240
1955-56	272224	40887	8491	328244	46497	8303	600467	87384	16794
1956-57	276994	41604	8639	334954	47447	8473	611948	89051	17112
1957-58	285017	42809	8890	334395	47368	8459	619412	90177	17348
1958-59	324697	48768	10127	310350	43962	7850	635047	92730	17978
1959-60	296579	44545	9250	320974	45467	8119	617553	90012	17369
1960-61	265916	39940	8294	331599	46972	8388	597515	86912	16682
1961-62	263346	38554	8214	356762	59536	9024	620108	90090	17238
1962-63	318045	47769	9920	403175	57111	10198	721220	104880	20118
1963-64	264379	39709	8246	460772	65270	11655	725151	104978	19901
1964-65	269998	40553	8421	475477	58853	10510	685474	99406	18931
1965-66	227754	34208	7103	456298	64636	11542	684052	98844	18646
1966-67	252798	37969	7884	509980	72240	12900	76278	110209	20785
1967-68	340359	51121	10616	569254	80636	14399	909613	131757	25015
1968-69	284653	42754	8878	580438	82172	14682	865091	124926	23561
1969-70	315660	47411	9845	589385	83488	14909	905045	130899	24754
1970-71	466064	70001	14536	597214	84597	15107	1063278	154598	29643
1971-72	379529	57004	11837	778950	110340	19708	1158479	167344	31541
1972-73	356711	53577	11126	772240	109390	19534	1128950	162967	30650
1973-74	367947	55265	11476	724709	102657	18332	1092156	157921	29808
1974-75	307312	46157	9585	697868	98855	17653	1005179	145012	27238

much larger capacities, better extraction rates, and more organized storage and handling facilities, they function about 100 to 150 days a year and in some cases all year round handling the bulk of the edible oilseeds. *kohlus* are a village industry, with very small capacities and low extraction rates, they function on local seed supply available around the unit only and remain idle most of the year. Hence the bias in the sample survey in favour of expellers can be justified but even so the results of this paper should be regarded as estimates.

CONCLUSIONS

The paper estimates the total production, value added, and employment in the oil milling sector. In addition, an attempt has been made to collect all the information available on the oil processing industry, (Appendix A) to uncover some of the reasons for its existing stagnation and to arrive at some results that might facilitate decision making. Without any idea of the growth of this sector, its contribution to GNP and employment, it is not possible to formulate policy on edible oil processing in Pakistan.

In 1974-75 the oil milling sector employed 27,238 people and generated a value-added of Rs. 1,005,179 thousand (in 1966 prices). These figures show the importance of this sector. It is amongst the largest of the agro-based industries.

The large employment offered and the value added generated indicate the need for serious decision making regarding techniques. There is a need to search for an intermediate technology, whereby a trade-off can be affected between employment loss which could occur if the raw material is diverted to the more capital intensive technique (i.e., solvent extraction) and the oil loss which is presently taking place.

One alternative to a complete shift to the often recommended capital intensive solvent extraction is to set up expellers in line with solvent extraction: first expelling of whole seed and then solvent extraction of the cake. But the problems facing the solvent extraction industry at present (see Appendix A) will have to be dealt with before this alternative can be effectively implemented.

The supply of raw material, i.e., oilseeds, is the vital factor influencing the growth of the oil milling sector. Due to the government fixed price of cottonseed oil (and the substitutible nature of edible oils the price of which also cannot very much exceed Rs. 200 per maund), the growers are discouraged from cultivating oilseeds because of poor returns (they use only marginal lands for these). If the returns were more attractive, indigenous production of oilseeds could catch-up with demand. In addition to the established oil seed crops there is scope for the large-scale cultivation of soybeans, safflowers and sunflower [2].

SOLVENT EXTRACTION

Appendix A

Solvent extraction is a new capital intensive chemical process for the extraction of oil from seed. Though extremely efficient—it leaves only about one to one half percent oil in meal—the process has proved uneconomical due to the high cost of the chemical hexane, coupled with almost negligible domestic demand and a persistent downward trend in the world market prices of the meal.

Because of the economic difficulties described above, solvent extraction is used only on expelled cake (and not wholeseed) mostly on cottonseed and a small amount of rapeseed [1, p. 54]. All solvent mills are equipped with expellers which crush the seed and remove a major portion of the oil. The rest of the oil in the cake is then solvent extracted.[3]

Introduced in 1959, with the sanction of two plants by PICIC (Pakistan Industrial Credit and Investment Corporation), there are at present 17 solvent units in the country (Appendix B). According to the Punjab Industrial Development Board only about 11 percent of the existing capacity of solvent units was utilized in 1975.

OIL MILLING

The bulk of the indegenous production of oilseeds is handled by the oil milling sector. The oil milling sector is composed of:

(*i*) *kohlus* or *ghanis*, and

(*ii*) Power driven high and low pressure expellers.

Kohlus or *ghanis* are a part of our tradition. There are reports of oil crushed by similar devices as far back as Alexander's time. The traditional mortar and pestle design made of wood and powered by bullocks has survived through centuries of technological change. Though *kohlus*, part wood and part stone, and lately all iron, powered by electricity and drawn by belts, do exist side by side. The oil and cakes from these processes are especially prized and fetch premium prices. The *kohlu* incidently does not crush cottonseed.

In 1964 the Department of Industries, Government of West Pakistan, estimated the number of *kohlus* in West Pakistan at 6,900 units. But a USAID survey showed that there were more than 1,000 units in and around Gujranwala Town only. A more reasonable estimate, is 15,000 units, or 1 in every 2 villages [9]. The same estimate implies a contribution of *kohlus* to total output at 1: 10.

The bullock driven *kohlu* working 8 hours a day crushes 1 maund of rapeseed, leaving 12 percent to 14 percent oil in cake while the power driven *kohlu* crushes 1.5 maunds rapeseed per 8 hours leaving 10 percent to 12 percent

[3]Apparently rapeseed contains sulphur which corrodes equipment, hence the hesitation to process rapeseed.

oil in cake. On the average this process expells only two-thirds of the oil in seed.

The high pressure expeller works on the same principle as the low pressure one. It can crush seed to remove oil, leaving only about 4 percent oil in cake. But the increased pressure causes darkening of the oil and loss of taste which reduces its market value. Hence most high pressure expellers are worked at low pressure except those which are used with solvent extraction—first high pressure expelling of the seed to extract oil and then solvent extraction of the cake to get the remaining oil from the meal. In fact solvent extraction is feasible in Pakistan only when done in this way [1, p. 54].

The low pressure Lahore-type expellers (Anderson Screw-type) handle the bulk of the oilseeds processed in the country. These expellers reduce whole cottonseed to 6-7 percent oil in cake by single pressing, and rapeseed and mustard seed to the same specifications by double pressing.

The Lahore expeller sells for Rs. 16,000 per unit with a rated capacity of 7.5 tons per day of cotton seed or 3.5 tons per day of rapeseed which means 0.91 tons of cottonseed oil and 6.6 tons of oil cakes or 1.08 tons of rapeseed oil and 2.4 tons of cakes per day. Sproull [8]. estimated 3,500 units in 1970 There are 135 expellers made per year, by 3 large manufacturers, one of whom claims to have produced 60 percent of the total number of units produced so far. These concerns started functioning in the early Forties which would suggest about 3,500 units have been produced since 1947 only. A more recent estimate by Ross [7] puts the number of expellers at 5,000 units with a total aggregate crushing capacity of 25,000 tons of seed daily.

No comprehensive survey has been conducted so far to estimate the number of units functioning, their capacity, etc. However the acute shortage of edible oils and the relative failure of more modern methods of extracting oils has awakened the Government's keen interest in this field.

Oil milling is more feasible economically though it leads to immense losses of oil, because:

(1) It is cheaper to install.

(2) Running costs are lesser than solvent process running costs.

(3) It can be operated at any level of production.

(4) It caters to the market around the unit.

(5) Oil cake—the by-product—fetches an attractive price and has a good market everywhere. The large amount of oil residue in cake leads to a bias in favour of the oil rich cake. Cattle owners in Pakistan do not approve of the protein rich but oil poor solvent meal.

Oil cake (or residual after the oil has been extracted) which makes up from 60 percent to 80 percent by weight of the oilseed is by far the most important consideration in the economic feasibility of any process.

Appendix B

SOLVENT EXTRACTION PLANTS IN PAKISTAN

Sind:

(1) Haji Dossa, Hyderabad.
(2) Oil and Cake Mill, Nawabshah.
(3) Bengal Oil Mill, Karachi.
(4) Burmah Oil Mill, Karachi.
(5) E.M. Oil Mill, Karachi.
(6) Cowasjee Barjorjee, Kotri.
(7) Mehboob Industries, Sukkur, and
(8) Cotton Ginning and Pressing Factory, Mehrabpur.

Punjab:

(1) Burewala Textile, Multan.
(2) Solvex Plant, Multan.
(3) S. Fazlur Rehman and Sons, Multan.
(4) Kohinoor Oil Mill, Kala Shah Kaku.
(5) Universal Oil Mill, Muredke.
(6) Grace Industries, Kabirwala.
(7) United Vegetable Ghee, Lyallpur.
(8) Ganesh Mill, Lyallpur and
(9) Sargodha Mill, Lyallpur.

Source: Investment Advisory Centre of Pakistan.

Appendix C

ECONOMICS OF GROUNDNUT OIL EXTRACTION

Oil Recovery		Maunds
Whole seed as is basis	=	100
Less dockage 6 percent	=	6
Balance Clean Seed	=	94
Less Excess Moisture 14 percent	=	13.6
Nominal Dry seed	=	80.84
Less Hulls 35 percent	=	28.294
Balance Kernel	=	52.546
40 percent Oil in Kernel	=	21.018
Oil recovery actual 38 percent	=	18.181
Meal recovery actual	=	34.670
		Rupees
Cost of 100 maunds seed at the rate of Rs. 93 per maund	=	9300.00
and 20 percent production/transport cost	=	1860.00
Total Cost:		11160.00
Deduct price of 34.679 maunds meal at the rate of Rs. 45 per maund	=	1560.56
Cost of production of 18.181 maund Oil	=	9599.44
1 maund	=	527.00

Source: [6]. Survey of the possibilities of Development of Groundnut Cultivation and extraction of Groundnut Oil in Pakistan, Economic Research Section, Planning Division, Government of Pakistan, 1975.

Note: (1) The seed price is the average price received by farmers and not the wholesale market price which was much higher.

(2) The price of Rs. 45 per maund of Groundnut meal is assumed. Since no market exists for the commodity it will fetch much lower prices.

(3) Solvent extraction rates are used for oil recovery. Milling rates are much lower.

Hence the price of Rs. 528 per maund of Groundnut oil is a very conservative figure. Actual costs would be much higher.

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