

## **Pakistan's Edible Oil Needs and Prospects for Self-sufficiency**

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### **1. INTRODUCTION**

In today's world economy, financial crises have been quite rampant and have been a source of greater misery, deprivation and poverty among a growing number of countries [Wolfensehn (1998)]. Some of the major causes of this state of affairs especially in Pakistan lie in rising debt servicing liabilities, receding donor assistance and growing saving-investment and import-export gaps [UN (1997)]. To the extent that the above situation can be ameliorated considerably by emphasis on domestic production especially in agriculture, this paper looks at possibilities of increasing the production of oil-crops for eliminating edible oil imports. It must be noted that self-reliance in edible oil is not important in its own right but would also be consistent with more judicious use of domestic resources, greater food security, enhanced welfare of consumers and producers and above all saving of scarce foreign exchange resources [Goldman (1975) and Mellor and Johnston (1984)].

In line with the above, the paper has the following outline. Section 2 reviews edible oil situation in the country. The factors underlying the growing edible oil deficit are highlighted in Section 3. In Section 4 discussion is centred on policy alternatives for attainment of self-sufficiency in edible oils through local production. The final Section 5 summarises the conclusions of the paper.

### **2. AN OVERVIEW OF EDIBLE OIL SECTOR**

Pakistan's edible oil sector has assumed growing importance over the last two decades. Out of its concerns to meet consumption requirements of a rapidly growing population, the government has not only stepped up efforts to increase domestic production but has also spent rising amounts of foreign exchange on edible oil imports. What has been the historical state of affairs in the edible oil sector is picked up by data in the following Table 1.

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Table 1

*Trends in Edible Oil Consumption, Production, Imports and  
Imports Bills for Selected Years Since 1949-50*

Years	Consumption (000 Tonnes)	Production (000 Tonnes)	Imports (000 Tonnes)	Import Bill (Rs Million)	Imports as Percent of Consumptions
1949-50	106	106	—	—	—
1954-55	154	154	—	—	—
1959-60	164	157	7	37	4.27
1964-65	193	179	14	190	9.25
1969-70	269	255	14	77	5.20
1974-75	468	274	194	1350	41.45
1979-80	601	255	346	2295	57.57
1984-85	973	309	664	6954	68.24
1989-90	1292	330	962	8262	74.46
1994-95	1739	344	1395	30701	80.22
1995-96	1671	528	1143	28673	68.40
1996-97	1595	538	1057	23906	66.27
1997-98	1765	586	1179	33304	66.80

*Source:* [Pakistan (1972, 1983 and 1998, 1998a)].

Evidently, as Table 1 reveals, Pakistan was self-reliant in edible oil at the time of independence in 1947 and it maintained this position throughout most of the Fifties. Towards the end of this decade Pakistan, however, began to import some small quantities of edible oil to supplement domestic production. As both consumption and production of edible oil exhibited the same growth rates between 1959-60 and 1969-70, there was no significant increase in edible oil imports. Since 1969-70 edible oil consumption began to grow at exorbitant rates and registered annual growth rates of 8.4, 8.0 and 6.1 percent respectively for the decades of 1970s, 1980s and first half of 1990s. By contrast domestic production failed to keep pace with the phenomenally high growth rates of edible oil consumption and registered growth rates which exceeded no more than 2.6 percent per year for any of the decades. As a consequence edible oil imports have grown at an accelerating pace. To be more precise, average annual growth rates of imports were in excess of 37.5 percent for the second half of the Seventies (full decade growth would not make sense due to low import base), 10.8 percent for the Eighties and first half of the Nineties. Although consumption and imports have declined during 1995-96, and 1996-97, they took an upward turn again in 1997-98. Import share in edible oil consumption rose from 4.27 percent in 1959-60 to 80.22 percent in 1994-95 but fell to 66.80 percent in 1997-98.

Partly in response to rapidly growing imports and partly as a result of rising prices, Pakistan's edible oil import bill has multiplied by more than 900 fold between 1959-60 and 1997-98 which corresponds with an annual growth rate of 21.2 percent and involves more than doubling of import bill every 4 years. What is more alarming to note is the fact that edible oil import bill has grown at an accelerating pace in the recent years and was equal to 30.1 percent per year during 1989-90 to 1994-95. Although the bill witnessed a significant fall during the two subsequent years, it reached a record figure of Rs 33.3 billion in 1997-98. Despite up and down movements, edible oils in terms of value remain the single largest food import item since 1979-80.

### 3. FACTORS IN GROWING EDIBLE OIL DEFICIT

A large number of factors can be brought to bear on the trends in edible oil sector and the growing wedge between consumption and domestic production of edible oil since 1969-70. Both the demand-side and supply-side factors are highly relevant in this respect and are a subject of discussion in the following pages.

#### 3.1. Demand-related Factors

Edible oils, as a protective food, are an integral part of human diet and their demand from year to year, like any food commodity, would vary in accordance with natural growth rate of population, growth of per capita income, changes in edible oil prices and, changes in the prices of available substitutes. More specifically, the growth rate of edible oil demand can be written as:

$$D = P + ay + bc + S$$

Where  $D$  represents rate of growth of demand for edible oil

$P$  = is population growth rate;

$a$  = is income elasticity of demand for edible oil;

$Y$  = stands for growth rate of per capita income;

$b$  = is price elasticity of demand for edible oils;

$c$  = refers to percentage change in oil prices; and

$s$  = is the rate of substitution between oil and its close substitutes.

It may be pointed out that most of the above factors motivated high demand and growth rates of consumption of edible oil in Pakistan. For example, Pakistan in the recent past experienced a phenomenally high growth rate of population exceeding 3.2 percent per year and the current intercensal growth rate has been estimated at 2.6 percent. Pakistan maintained a growth rate of per capita income of nearly 3.0 percent between 1979-80 and 1996-97 resulting in the annual increase of nearly 2.5 percent at the estimated average income elasticity of demand for edible oil exceeding 0.80 [Bouis

(1992)]. Although edible oil prices can be varied to dampen growth of consumption, they were kept low and had no appreciable effect [USDA (1984)]. As the price elasticity of demand for edible oils did not exceed 0.1, even large increases in prices proved to be inadequate to contain consumption appreciably [Burney and Akmal (1991)]. The things were further compounded by a rapid shift from Ghee (butter oil) to vegetable oil, because of former's very high prices relative to that of the latter. According to government sources animal fats accounted for more than 60 percent of total fat consumption in 1969-70 [Pakistan (1973)] but were only 12 percent in 1992-93 [Pakistan (1995a)]. The butter oil consumption went down from 11.3 gms per capita per day in 1969-70 to 4.3 gms in 1992-93 which corresponds to an annual fall of nearly 4.0 percent and implies an equal addition to edible oil demand due to substitution. Finally, edible oil prices in the neighbouring countries have been very high and part of the household consumption increase may in fact reflect on added demand for smuggling [Ahmed and Hanif (1986)]. The difference between per capita availability of 34.25 gms and actual consumption of 30.0 gms per day of edible oil during 1992-93 points to at least a 14 percent leakage which should mainly be attributed to smuggling across the borders [Pakistan (1998)].

### 3.2. Supply-side Factors

Part of the reason for oil shortages as argued before is the slower growth of domestic production which could be explained by reference to a number of factors. Before going into these factors, it is important to know as to what are the major domestic sources of edible oil in Pakistan. While many agricultural crops can be a source of oil, seven of them, as shown in the following Table 2, form the crux of the matter along with their relative contributions in the recent years.

Table 2

*Area and Domestic Production of Major Oil Crops in Pakistan for 1996-97*

Oil Crops	Area (Acres)	Crop Production (Tonnes)	Edible Oil Production (Tonnes)	Edible Oil Yield per Acre
Cotton	7,250,000	3,401,000	346,984	47.86
Rapeseed	500,000	182,000	58,482	116.96
Sunflower	315,000	217,000	82,460	261.78
Canola	260,000	128,675	48,897	188.06
Soyabeans	9,000	5,000	900	100.00
Safflower	4,000	1,500	270	67.50
Total	8,338,000	—	537,993	64.52

Source: Dogar (1997).

Although grown as a fibre crop, cotton is still the largest domestic source of edible oil in Pakistan and accounts for as much as 64.5 percent of domestic production. Sunflower accounts for another 15.3 percent and the respective shares of rapeseed and canola are nearly 11.0 and 9.0 percent. Soyabeans and safflower contribute only negligibly to edible oil production. Sesame, groundnut and maize are other oil crops but have sparingly been used in Pakistan for oil extraction.

The stagnating or limited growth of edible oil production on the domestic front follows from the neglect of agriculture in general and oil crops sector in particular in the government policy circles. This follows from the fact that cotton which is a fibre crop remains a dominant source of domestic edible oil production. By contrast, share of pure oil crops has at best been stagnating at one-third since 1984-85 [Muhammad (1986) and Dogar (1997)]. Second, most of the oil crops are low yielding. They were competed out of cultivation by the onslaught of High Yielding Varieties (HYVs) of wheat, rice, maize and more recently cotton. As a result their area fell consistently since the 1960s. Third, oil crops also suffered from worst kinds of disincentives. While price support system for major crops was initiated in the 1960s, none existed for oil crops until recently and that too covered only non-traditional oil seeds. As a result oil seed growers faced low and uncertain market prices that dampened private investment and keen human interest for growing oil seed crops. In fact, government policy was heavily biased in favour of edible oil industry in terms of price guarantees and supply of imported oil to the complete neglect of oil seed sector. Under these circumstances, the growing of oil seed crops could only be pursued with minimum of investment and human effort. Fourth, technological breakthroughs in oil crops have been uncommon and recently evolved varieties of non-traditional oil seeds are not backed by enough seed supply, input package information and sowing and harvesting equipment. Fifth, there is a total lack of market infrastructure for oil crops. Sixth, oil seed crops, like main stream agriculture, have to contend with inadequate, poor quality, expensive, and occasionally fictitious supply of necessary inputs like fertilisers, pesticides and water [Chaudhry (1995)]. Finally, the post-harvest losses and inefficient extraction technology may be responsible for a considerable proportion of short fall in edible oil requirements. Some of the available estimates put these losses at nearly 230–250 thousand tonnes per year [Pakistan (1995)].

#### **4. PROSPECTS FOR SELF-SUFFICIENCY**

Although self-sufficiency in edible oils in the short run may not be possible, the long term prospects over a period of 10–15 years seem to be reasonably bright for at least four reasons. Firstly, apart from traditional and non-traditional oil seeds currently grown in Pakistan, the potential for introducing more crops remains unexploited. For example, certain varieties of oil palm and coconut can be grown

successfully in the costal areas of Sindh and Balochistan and can add considerably to oil production without competing for land resources. The same is true of olive cultivation in the mountainous areas of Punjab, NWFP and Balochistan. Jajoba, salicornia and salvadora are other oil crops which can be grown in marginal lands and under-exploited regions. Secondly, quite a significant amount of oil is lost due to inefficient or absence of appropriate equipment for harvesting and processing of oil crops. According to government sources as pointed out before, the oil lost in cotton seed cake, rice bran and maize products alone would come to 230 thousand tonnes which accounts for nearly 13 percent of current consumption [Pakistan (1995a)]. Thirdly, most of the oil crops grow in Pakistan have considerable untapped yield potential as is shown by the following Table 3.

Table 3

*Actual and Potential Yields and Comparative Advantage of Oil Crops in Pakistan*

Oil Crop	Yields in Kgs per Hectare		Actual as Percent of Potential	Domestic Resource Cost Ratios
	Actual Yield 1996-97	Potential Yield		
Seed Cotton	506	--	--	0.25
Rape and Mustard	807	2765	29.19	0.54
Ground Nut	1119	5000	22.38	--
Sesame	452	1000	37.67	--
Sunflower	1002	1800	55.67	0.61
Safflower	672	180	37.33	0.66
Soyabean	1295	2500	50.18	0.51
Canola	1223	2765	44.23	0.50
Maize	1445	10000	14.45	1.29

Source: [Muhammad (1986); Pakistan (1998); Mahmood (1991) and Longmire and Debord (1993)].

It follows from the above table that Pakistan's actual oil crop yields are only 14-56 percent of the potential yields. The yield gap is highly pronounced in the case of maize and groundnut. Although harvest yields show an improvement in the case of soyabean and sunflower, they are only half the potential even here. Finally, it also follows from Table 3 that Pakistan possesses comparative advantage in the production of most of the oilseed crops as the calculated domestic resource cost ratios (DRCs) for cotton seed, soyabeans, rapeseed, sunflower safflower and canola fall well below unity. The same follows from positive rates of social profitability reported in Mahmood and Chaudhry (1994). Although estimated DRCs for maize exceed 1.0, the recent technological breakthrough in the form of spring hybrid maize has resulted in astronomical yields of 100-120 mnds per acre with nominal additional costs and must have forged

comparative advantage in favour of Pakistan. Similarly most of the plantation crops like oil palm, coconut and olives except for initial costs of planting require few if any variable costs and can justifiably be grown in Pakistan. In view of the above, growing emphasis on the production of oil crops would not only be compatible with greater efficiency of agricultural production at home but would also be cheaper than oil imports.

As a drive towards self-sufficiency, the need for realising full yield potential of oil seeds and exploitation of comparative advantage can hardly be overemphasised. This would require many fundamental changes in policy towards agriculture in general and oil crops in particular.

As a first step, various edible oil sources should be attached priorities on the basis of their oil yields, contribution to other national objectives and suitability of climatic conditions. On the basis of oil yields per acre as reported in Table 2, sunflower and canola stand out most prominently and their cultivation must receive priority over other oil seeds. Although not reported in Table 2, spring maize with per hectare yield exceeding 10 tonnes of grain and 500 Kgs of oil, should also be added to this list. As maize meal is a more nutritive food than wheat for human consumption and is a preferred ingredient of animal and poultry feed, greater cultivation of spring maize can be used to ensure food self-sufficiency, better nutrition, stepped up milk and meat production and elimination of feed imports. In order to reap maximum benefits, the government would be well advised to discourage cultivation of spring sunflower and late sown wheat in the Punjab and NWFP and create more conducive environment for expanding area under spring maize by nearly one million hectares. At the current yield level replacement of one million hectares of wheat with maize should lead to an addition of 8 million tonnes of grain (10 tonnes of maize minus 2 tonnes of wheat) and 500 thousand tonnes of oil. This would totally eliminate wheat and feed imports and curtail oil imports to half the current level. To the extent that considerable maize grain surplus will still be at hand, it could be fed to animals and poultry for greater milk, egg and meat production. As certain varieties of oil palm and coconut can be grown in the coastal areas of Balochistan and Sindh and those of olives in hill tract, of Punjab, raising of sufficient nurseries and development of tree plantations should be accorded highest priority. In view of *Salicornia's* capability to withstand drought and high concentration of salts, it should be earmarked for cultivation in the marginal, low rain, desert and saline soils. In the light of the above, all other crops grown for oil should be replaced by either of the above oil crops. As animal fats are a substitute for vegetable oils, rapid development of livestock sector would be a step in the right direction for achieving the goal of edible oil self-sufficiency over the years. Not only that, the greater animal output would promote food-feed interactions, cleaner environment and reduce fertiliser and milk import bills.

Secondly, the large unrealised yield potential of oil crops must be exploited by creating more attractive and conducive environment through the establishment of an effective system of regulated markets for all agricultural commodities including the oil seed crops in the private sector. This would require continuation of price support programme for oil crops but dissolution of public sector parastatals and monopsony positions for insurance against market gluts and fluctuating prices. As a further safeguard, market committee membership comprising of government officials, market functionaries and farmers should insist on display of market information and willingly provide market intelligence services. As input markets are even in greater disarray, more drastic measures need to be adopted for their smooth functioning. For example, the production and sale of impure seeds, substandard and underbagged fertilisers and fictitious insecticides should be dealt with severe penalties. Free market sales by anyone instead of cartelised dealers of insecticides and fertilisers should be allowed. To maximise returns to agriculture black marketing should be uprooted by timely, assured and adequate supply of quality modern inputs. In the case of irrigation water farmers should be given greater rights vis-à-vis irrigation officials for ascertaining equitable water distribution, fair pricing policy and improvement of water courses. To facilitate timely sowing and harvesting, development of appropriate sowing and harvesting equipment for oilseed crops seems to be a necessity to bring them at par with facilities for the cultivation of major crops.

Thirdly, although high yielding varieties (HYVs) of most oil crops are available, consistent efforts at adaptive research must continue to evolve new varieties and to deal effectively with any degeneration problems of existing varieties. Efforts under National Oilseed Development Board for domestic seed supply of HYVs of oilseeds have been successful and must be backed by adequate funding. For effective transfer of research findings to farmer's field, the missing links between research, teaching and extension need to be revived. In order to facilitate coordination, the three departments must be given joint budgets for organising joint meetings, demonstration plots and field visits.

Fourthly, edible oil leakages due to waste or smuggling across the borders must be effectively plugged. For the former, efficiency of the oil extracting units need to be stepped up. This can be done by encouraging solvent extraction plants instead of expellers for processing of oil seed crops. In order to minimise leakages due to smuggling, borders must be effectively sealed, prices of edible oil raised to levels across the border and severe penalties imposed for illicit trade practices.

Finally, needless to add that population control measures can result in a significant fall in population growth rates and correspondingly dampen the increase in edible oil consumption.



## 5. SUMMARY AND CONCLUSIONS

This paper is intended at exploring Pakistan's potential for self-sufficiency in edible oil production. It reviewed edible oil situation and Pakistan's efforts to eliminate import dependence. Despite these attempts, Pakistan plunged deeper into oil imports due to slower growth of output compared to sharp increases in demand. As a consequence, Pakistan's edible oil import bill has grown at a tremendous rate and has become unaffordable in the recent years. Many factors have been responsible for this sad state of affairs including rapid population growth, low oil prices, rising incomes, substitution of edible oil for animal fats, disincentive pricing, competition from HYVs of other crops, lack of proper marketing and appropriate sowing and harvesting equipment, nonavailability of modern inputs at appropriate time, place and prices, harvest and postharvest losses, inefficiency of oil extracting plants and smuggling across the borders. In order to attain greater self-reliance, Pakistan need to exploit its unrealised yield potential and comparative advantage in the production of oil crops. In order to accomplish this effectively the cultivation of individual oil crops should be attached priority on the basis of their oil yields, climatic requirements and consistency with other national objectives. Price incentives through price support programme effective marketing facilities and supply of quality inputs including seed, fertilisers and pesticides at the most appropriate time and place in sufficient quantities should be ensured. The efforts of research, teaching and extension should be closely coordinated. The rapid development of livestock sector, effective plugging of international borders to discourage illicit trade practices and continuing emphasis on population control measures can considerably dampen the growth of edible oil demand and import bills.

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## Comments

Using historical data, the authors have very lucidly demonstrated that Pakistan was self-reliant in edible oil at the time of independence in 1947. Due to growing demand and stagnant production, the country started relying on imports to meet domestic demand. As a consequence, import share in edible oil consumption rose from 4.27 percent in 1959-60 to 80.22 percent in 1994-95. Though the import share fell to 66.80 percent in 1997-98, due to rising prices, the import bill in monetary terms reached a record figure of Rs 33.3 billion during the same period.

The paper, therefore, is very timely and addresses issues of current relevance for agricultural development and food security of the country. The authors, appropriately look at the possibilities to increase production of oil crops to reduce edible oil imports to the extend economically viable.

It provides a good analysis of increase in demand for edible oils in Pakistan, clearly illustrating the factors responsible and suggests that Pakistan has the potential to be self-sufficient in edible oil. It shows that—(i) oil crops presently grown have considerable untapped yield potential and that (ii) there are opportunities/potentials to grow alternative oil-crops in Pakistan.

In its policy recommendations, the authors emphasises a shift in favour of alternative oil-crops and proposes a move away from the traditional sources of oil/fats to maize, palm, coconut and olives. The proposal includes conversion of 1 million hectares of wheat land into maize and production of palm, coconut and olives in the marginal lands. However, the paper does not include an analysis of the economic viability of the proposed alternatives nor explains what needs to be done to make the farmers switch from wheat to maize and grow non-traditional oil crops in the marginal lands.

Experience has shown that the introduction of minor oilseeds suited for marginal lands is not likely to succeed on a large scale. Introduction of oil palm and coconut palm has been tried with rather limited success in neighbouring India. Expanded cultivation of spring maize may yield additional oil but its introduction depends primarily on market fundamentals for coarse grains. A shift from wheat to maize is difficult to anticipate as it is the staple food and the country is a net importer of wheat. A shift away from cottonseed towards higher oil-yielding seeds can not be expected as cotton production will continue to be determined by the fibre industry, the country's top export earner.

Due to the fact that the yield of the traditional oil-crops has not shown any marked improvement during the last decade, the authors may have decided not to

advocate this alternative as much as they have proposed a shift towards new oil crops.

Current yield of most of the oil-crops grown is around 30 percent of potential. Increase in yield close to 60–70 percent of potential will be enough to make the country nearly self-sufficient in edible oil. Thus, it would appear that solution to edible oil-import lies in enhancing yield of existing oil-crops. Therefore the authors recommendations can be further strengthened and or substantiated by including a comparative analysis of cost and benefit of investing to increase yield of the traditional oil crops vis-à-vis area expansion and introduction of non-traditional oil crops.

It should also be noted that one of the reasons for stagnant production of oil seeds is related to policies. Traditionally, and even more so in recent years, Pakistan's agricultural and food policies in the oilseeds area have favoured consumer interests in detriment to producers. Retail prices for edible oils continue to be regulated to avoid price escalation. Edible oils are exempted from sales tax. After having lowered import duties for oils to facilitate imports, the government lifted all import charges for oilseeds recognising the importance of a strong processing sector and value-added savings by crashing imported seeds. By contrast, there are few specific incentives for producers; the support price for soyabeans has been suspended since 1995; the support price for cottonseed now tends to be lower than the market price.

Removal of the policy biases against oil-seed will most likely provide positive incentives to increased oil seed production. In addition, efforts to reduce post-harvest losses (according to the authors, some of the available estimates put these losses at nearly 230–250 thousand tons per year) and improve extraction technology will also contribute to increase domestic supply. Therefore, the paper can be further improved by incorporating an analysis/estimate of the impact of policy reform and introduction of improved post-harvest management and technology on production.

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