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**CONSULTANT REPORT ON THE FY 1989  
PL 480 AGREEMENT AND SUGGESTIONS FOR  
FUTURE PROGRAM PRIORITIES**

**PAKISTAN**

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## PREFACE

The USAID purchase order 391-0470-0-00-9052-00 of August 20, 1988 calls for the following to be produced by the consultant.

### Scope of Work

The Contractor's duties and responsibilities shall include, but not be limited to the following:

### Requirements of the Report

Provide to the Chief, Office of Program, USAID/Islamabad a draft report consisting of the Draft FY 1989 PL 480 Title I Agreement between the Government of the United States of America and the Government of the Islamic Republic of Pakistan for the sale of agricultural commodities. The draft agreement should correspond to the format provided by the Program Office. The draft report shall contain the following annexes which will form an integral part of the draft agreement:

- Annex I PL 480 Title I FY 1989 Agreement--Special Items for Discussion;
- Annex II Self-Help Measures (SHMs) and Benchmarks for the FY 1989 PL 480 Title I Agreement;
- Annex III The Schedule of Consultations and Reports Required Under the FY 1989 PL 480 Title I Agreement; and
- Annex IV The Requirements for Quarterly Compliance Report for the said Agreement.

In addition, the Contractor shall provide the Mission with written recommendations, regarding a long-term PL 480 strategy, including objectives, plans, and benchmarks.

Pursuant to this purchase order and requests of the Program Office the following were produced between August 20 and September 16, 1988.

1. The initial draft of the complete PL 480 agreement with minutes of negotiation and appendices 1,2,3,4,5 (referred to as annexes in the purchase order) following standard U.S. guidance and precedents on such agreements. The consultant participated in the negotiations and in reporting and making the minor modifications in the agreement, minutes and appendices as changes were negotiated.
2. Draft report including a report on the cooking oil situation relative to Self-Help Measure No. 1 of the 1989 agreement.
3. A draft side letter setting forth recommendations and understandings on implementation of the 1989 agreement.

4. Background and terms of reference for new Self-Help Measure No. 6 which stated:

**Self-Help Measure No. 6 - Action to Develop New Self-Help Measures**

The establishment of a joint working committee which would include representatives of GOP (Economic Affairs Division, Ministry of Food and Agriculture, and other members) and USG (USAID, AGATT, ECON). The joint committee would start work immediately to:

- a) Review past agreements, from 1982, especially SHM and their implementation.
- b) Review progress in major PL 480 related sectors, i.e. agriculture, health/nutrition/population in the context of government's development plans.
- c) Identify areas requiring special efforts that might be supported by PL 480 and the appropriate candidates for inclusion in any future PL 480 SHMs and PL 480 local currency use.

**Benchmarks**

- a) Establishment of the joint committee by November 30, 1988, with a definition of its terms of reference.
  - b) Draft report of the joint committee by April 30, 1989.
5. Suggestions on future PL 480 programs.

This report covers items 4 and 5 listed above. Work prepared for items 1 and 2 are a part of the PL 480 agreement and item 3 was made available for inclusion in the annual self help report.

I. **TERMS OF REFERENCE FOR JOINT STUDY TO DEVELOP PLANS FOR FUTURE PL 480 ACTIVITIES**

A. **Background**

The U.S. and Pakistan have had an annual Food Aid agreement each year without a break since 1952. The U.S. legislation (Public Law 480 or PL 480) under which this program is provided has changed considerably over the years as has the composition of the commodities imported. In the past two decades changes in the law have increasingly reflected concerns that the availability of concessional food financing and donations not discourage local production or contribute to reduced government efforts to stimulate and support local production. This has been implemented by requiring that each agreement specify self-help measures that the recipient country (in this case Pakistan) is taking to promote and support increases in its agricultural production and improvement in the well being of low income and vulnerable groups and their participation in economic progress.

B. **Self-Help Measures**

Relevant U.S. regulations governing PL 480 agreements specify that "before entering into agreements for the sale of commodities, consideration be given to the extent to which the recipient country is undertaking, whenever possible, self-help measures to increase per capita production and improve the means for storage and distribution of agricultural commodities. In addition, it is required that particular account be taken to determine the extent to which the measures are being carried out in ways designed to contribute directly to development progress in poor rural areas and to enable the poor to participate actively in increasing agricultural production through small farm agriculture. Section 109 includes literacy and health programs for the rural poor as possible subjects for self-help measures."

Further, "the self-help measures which the recipient country agrees to undertake shall be described (1) to the maximum extent feasible in specific and measurable terms, and (2) in a manner which ensures that the needy people in the recipient country will be the major beneficiaries of the self-help measures. To the maximum extent feasible, self-help measures agreed to are to be additional to the measures that the recipient country otherwise would have undertaken irrespective of this agreement."

The regulations further direct that specific commitment targets must be sought as "As a means to measure the extent to which economic development and self-help measures have been carried out. Specific and measurable targets by which to

measure progress can include: physical progress, financial measures, policy changes, price announcements; or deadlines for completing research studies, funding or completing projects, signing contracts, or implementing policy changes. It is expected that targets for the self-help measures will be set so that achieving them will not be automatic, but will require special effort."

Measures called for are to be additional to what would have been carried out in the absence of the PL 480 food aid program. This can be taken to mean measures outside the development plan or those within the plans but which would not have been fully or adequately supported in the absence of the agreement and the resources provided thereby. Determination whether the "self-help measures" are being carried out will be made by initial establishment of specific time phased measures (benchmarks) of progress and annual evaluations and reporting of progress against the specific measures and benchmarks.

To the extent possible the program should identify and define specific goals to which it contributes. The measures of progress in turn should be related either to the specific goals agreed upon or to purposes which if achieved are expected to contribute to the agreed upon goals.

It is implicit in the above, that preferred goals addressed directly or indirectly are increase in food production, development progress in rural areas especially lower income rural areas and improvement in the incomes of rural poor. Nutrition, health and educational improvement among the poor are appropriate objectives.

1. Use of Local Currency Generated by Sale of the Imported Commodities

Section 106 (B) (1) of PL 480 provides that emphasis shall be placed on the use of proceeds from local sale of the imported commodities for purposes which directly improve the lives of the poorest of the purchasing country's people and their capacity to participate in the development of their country. Greatest emphasis is required to be placed on the use of such proceeds to carry out programs of agricultural development, rural development, nutrition, and population planning in accordance with the self-help measures specified in the agreement.

1985 food aid legislation contained amendments designed to stimulate private enterprise in developing countries to promote economic growth and development. One such amendment contains a new section 106(B)(4), which

specifically provides for proceeds (local currency generated by sales of imported commodities), to be used through intermediary financial institutions (IFI's) for private sector development. Another 1985 amendment added section 108, covering U.S.-owned local currency, also to be used through IFI's for private sector development.

**C. Past Programs**

Agreements through the early 1970's emphasized and supported improvement in the irrigation system, increased use of high yielding crop varieties, a national fertilizer strategy, and price incentives to stimulate increased production of wheat. When wheat self-sufficiency appeared likely to be achieved, attention shifted to measures to reduce the gap between vegetable oil production and consumption and thus reduce import dependence. The Government of Pakistan and the U.S. Government had periodically expressed their concerns over stagnation in domestic production of vegetable oil, rapidly increasing consumption and the growing gap between domestic production and total disappearance and the high cost to the government of the vegetable oil sector. In 1975-6 pursuant to these agreements the government undertook the development of a comprehensive vegetable oil strategy and began implementing this strategy. Unfortunately due to an alarm over wheat rust in 1978, attention and resources were diverted back to wheat.

When the wheat rust alarm proved to be largely unfounded, emphasis was again shifted to vegetable oil in the 1981-2 agreements. A large team was assembled to carry out an analysis of the vegetable oil sector and recommend measures to improve the situation with respect to vegetable oil. The various agreements since 1981-82 have concentrated on measures aimed at improvement in operation of the vegetable oil sector, and reduction in government costs and reducing the growing supply/demand gap. The program has been successful in reducing government expenditures and increasing the private sector role in vegetable oil trade, processing and marketing. However, there is little evidence that there has been any positive impact on growth in production or in reducing the supply/demand gap.

By 1988 most of the measures visualized in 1982 and later had been incorporated. Some have been rejected. At the review preparatory to signature of the FY 1989 agreement, it was agreed that this would be an appropriate time to reconsider priorities for PL 480 support in the next five years (1990-94). With this in mind the two governments agreed to include a new measure in the 1989 agreement as follows.

1. "Self-Help Measure No.6 - Action to Develop New Self-Help Measures

The establishment of a joint working committee which would include representatives of GOP (Economic Affairs Division, Ministry of Food and Agriculture, and other members) and USG (USAID, AGATT, ECON). The joint committee would start work immediately to:

- a) Review past agreements, from 1982, especially SHM and their implementation.
- b) Review progress in major PL 480 related sectors, i.e. agriculture, health/nutrition/ population. in the context of government's development plans.
- c) Identify areas requiring special efforts that might be supported by PL 480 and the appropriate candidates for inclusion in future PL 480 SHMs and PL 480 local currency use.

Benchmarks

- a) Establishment of the joint committee by November 30, 1988, with a definition of its terms of reference.
- b) Draft report of the joint committee by April 30, 1989.

A first draft of the terms of reference and specific analytical tasks for such a study follows:

**II. SUGGESTED TERMS OF REFERENCE FOR THE JOINT STUDY GROUP**

**Task 1. Review past food aid programs.**

**Objective:** To identify and define relevant rules and regulations governing PL 480 and their application in Pakistan.

- 1.1 Identify and assemble relevant literature and other information from AID/W, USAID and Government of Pakistan sources (the latter mainly EAD, Ministry of Food & Agriculture, Ministry of Industry and Ghee Corporation). This should include annual PL 480 agreements (especially those parts relating to self-help measures and local currency use), annual GOP Self Help Reports and LC reports, reports of projects supported by PL 480, special reports and studies and other guidance on PL 480 (A list of some relevant publications is included in annex 1.
- 1.2 Review these materials and summarize relevant guidelines including objectives of PL 480, methods of operation, range of flexibility in legislation and regulations.
- 1.3 Identify, review and summarize relevant experience from Pakistan and other countries on use of PL 480 programs and resources to advance agriculture, equity, and population, health and nutrition objectives. Particular attention should be paid to identification of successful approaches and experience in use of PL 480 resources in these sectors.
- 1.4 As appropriate, identify experienced and knowledgeable individuals and conduct in depth interviews to gain additional insight into potentially successful approaches, activities and resource applications.

**Task 2. Review of the existing situation, development plans and priorities.** This will include review of goals, overall plans and priorities, progress being made in major relevant sectors and subsectors; major constraints; resources available.

- 2.1 Identify and assemble relevant documents, e.g. 7th Five-year Plan; Report of the National Commission on Agriculture; Policy Statements of leaders; Provincial planning documents; relevant PC-1s; special studies such as the Vegetable Oil Study of 1984.
- 2.2 Review these and other recent economic and social development data; apply criteria such as established needs, opportunities for major economic growth, potential for improvement in income, income

distribution, nutrition, etc. to identify possible sector activities or programs for support under future PL 480 programs proposed for \$ 80 million per year; list candidates in order of priority.

- 2.3 Conduct additional analyses as appropriate to further define these candidates. Consider extent of opportunities; relevant available resources; nature and magnitude of constraints; requirements for constraint removal. Tentatively define targets for each (some possibilities are outlined in the following sections).
- 2.4 Identify and discuss conclusions with individuals who can assist in further appraisal of the suitability and acceptability of alternative candidates (e.g. officials in EAD, USAID, AID/W, USDA).
- 2.5 Prepare a brief paper outlining for each major candidate:
  - existing situation
  - objective of the program visualized including quantitative targets
  - relationship to national goals, objectives and plans
  - plans for implementation with action schedules and clearly defined benchmarks
  - inputs required and outputs expected, with schedules, e.g. specific targets on growth in production, income, employment, nutrition, etc.
  - levels and sources of funding anticipated
  - expected assignment of responsibilities for implementation
  - cost and benefit analysis, including for the latter the likely beneficiaries and distribution of benefits such as increases in income, employment, nutrition and other positive impacts on the poor. Possible negative impacts also should be identified.

### **Task 3. Review of Proposals**

- 3.1 As appropriate edit and circulate the proposals to concerned individuals in the GOP (EAD, MINFAC, etc) and U.S. Embassy (USAID, AgAttache, Economics) for their comments.
- 3.2 Conduct formal reviews; ascertain views on suitability, acceptability and suggestions for improvement (Additional review by Washington agencies might be conducted at this point).

- 3.3 Reduce number of candidate activities programs; improve focus of programs; and prepare preliminary recommendations.

**Task 4. Final Study, Preparation of Plans**

- 4.1 Review proposals, assemble all information assembled on each candidate; conduct comparative analyses; identify needs for any additional study.
- 4.2 Conduct in-house studies or commission special studies, as appropriate and needed, to supply information required for decisions (arrange financing, contract for study, etc). In general these studies should be kept to two months or less and should include analyses of the types outlined in 2.5 plus preparation of detailed implementation plans and economic, technical and management analysis at a pre-feasibility level. Where required, do preliminary environmental analysis.
- 4.3 Prepare and distribute reports from step 4.2.

**Task 5. Selection of Candidates for support under the 1990-94 PL 480 Program**

- 5.1 Establish criteria for selection or ordering of priorities.
- 5.2 Review studies and other information and define priorities.

**Task 6. Prepare PL 480 Program Proposal**

- 6.1 Prepare a draft PL 480 proposal for submission to the appropriate GOP and Washington agencies for consideration.
- 6.2 As appropriate receive comments and modify the proposed program.

The Joint Study Group would be responsible for tasks 1.0-5.0. Thereafter the appropriate GOP and USG officials (EAD and USAID/PRO) would prepare the 1990 PL 480 agreement incorporating the agreed upon program.

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**IV. SUGGESTIONS FOR POSSIBLE PL 480 1990-1994 EMPHASIS**

**Theme:** Improve efficiency of use of available resources.

**A. Goals**

1. Increase agricultural production and real income by more efficient use of available resources.
2. Conserve natural resources and the environment to sustain future productive potential.

**B. Illustrative Purposes/Activities**

The following are illustrative purposes/activities that might be emphasized. (In many areas AID has ongoing activities as does the GOP that would require coordination.)

1. **Better use of Fertilizer:** More output with a given level of fertilizer by better balance of major and minor nutrients and better fertilizer application. This program would contribute to and be complemented by ongoing USAID activities such as: a) Integrated pest management to better control pests with a given level of chemical use; b) Improved water distribution and on-farm water management; c) Seed improvement;
2. **Reduce the vegetable oil supply-demand gap by:** a) Improved harvesting, handling and processing of oilseeds; b) Increased production of oilseeds by use of land which is in fallow or between rotations, e.g. oilseeds planted in late winter, and harvested in May in a cotton-cotton rotation; c) Measures to reduce disappearance of fats and oils.
3. **Improve efficiency and levels of output of livestock by better feed supplies, better management and better marketing of milk, poultry and eggs.** This should be integrated with oilseed production and processing.
4. **Measures to improve and increase uses of renewable energy sources and improve the environment** (fast growing trees on private lands for fuel, feed and food; solar energy; more efficient use of local fuels such as dung, wood and fossil fuels; small scale hydroelectric power; use of sugarcane residue).
5. **Development/exploitation of substitutes for imported wood products** (e.g. use of bagasse for building material, paper, etc);

6. **Nutrition education** to encourage people to increase consumption of protein and vitamins from available resources, e.g. increased use of: (i) soybeans as substitute for meat; (ii) spinach, mustard greens, squash and pumpkin, etc., as vitamin A and C sources; (iii) encourage growing of vegetables in village gardens.
7. **Foreign trade development:** development of markets for high value agricultural products in raw or processed form, e.g. follow on to the IBRD Effective Rates of Protection study to increase trade.

V. **SUGGESTED PRIORITIES FOR PL 480 SUPPORT**

Two areas merit particular attention in Pakistan at the present time and are recommended for PL 480 support. These are: (a) Improvement in efficiency of fertilizer use and in rates of return to application of fertilization (Item No.1 listed above); (b) An integrated program directed at improved production and processing of oilseeds and other measures to reduce the supply-demand gap, closely coordinated and vertically integrated with a program to improve feed supplies and production and marketing of poultry and dairy products. This is proposed as an integrated approach to items 2 and 3 above. The two programs proposed will:

- increase efficiency in use of natural resources and agricultural production inputs especially those inputs involving major investments and/or FX costs;
- increase agricultural growth rates in commodities where demand is growing rapidly and major opportunities exist for import substitution;
- reduce costs of production and hence make Pakistan's agriculture more competitive;
- improve nutritional levels by increasing domestic production and reducing costs of nutritious food; and
- use national resources in ways that increase both short run and long run productivity.

The proposals are consistent with priorities of the Report of the National Commission on Agriculture and the 7th Five-year Plan and the Economic Survey of Pakistan, 1987-88.

A. **Improved Efficiency in use of Fertilizer**

Consumption of fertilizer has grown rapidly over the past 30 years largely as a result of comprehensive supply/distribution/pricing strategy carried out over this period. The result has been increase from 6000 MT of fertilizer used in the 1955-56 to the current consumption of over 1.5 million MT per year and target consumption of about 2.3 million MT of nutrients per year by 1993, the end of the 7th Five-Year Plan period. The cost at world prices of the planned level of consumption, will be over \$ 1 billion per year by the year 1993. The strategy with some gaps has generally included ambitious annual consumption targets based on crop production targets; intermediate range fertilizer production targets aimed at self-sufficiency with adequate provision for investment in local fertilizer production and interim imports; farm price incentives and fertilizer promotion efforts; sound supply planning and management; and both private and public sectors involvement in distribution. That crop production targets have been reached with considerable regularity is largely attributable to success in the fertilizer program and complementary water program. Both fertilizer and irrigation development were major elements in the

U.S. assistance agenda beginning in the early 1950's.

Beginning in the early 1970's the U.S. supported study and analysis which first identified, measured and publicized large losses in the irrigation system and inefficiency in water use and supported a major program to improve water use efficiently. However, neither the U.S. nor the Government of Pakistan has systematically examined the levels of efficiency in fertilizer use nor undertaken efforts to increase efficiency beyond the general recommendation of targeting aggregate national phosphate consumption to a level of 1 kg of P<sub>2</sub>O<sub>5</sub> for each 2 kg of nitrogen applied. To the extent it has received general attention, fertilizer use efficiency has concentrated on achieving a target of 2:1 on the N/P ratio though the appropriateness of this target for Pakistan as a whole has never been tested nor has it been widely tested on a field and crop specific basis. It is recognized by soil and crop scientists that determination of the requirements for individual crops and fields is the appropriate basis for deciding on fertilizer application rates and types. Though fertilizer has been the major contributor to rapid growth in crop production over the past 15 years, macro data on fertilizer use and crop yields compared with other countries suggests that returns to fertilizer use are low. Use of fertilizer in Pakistan currently is about 80 kg/hectare. The target for 1993 is about 115 kg/hectare which is very near the current U.S. rate of use per hectare. Application rates are high compared with most other Asian countries (other than Japan, the Koreans and Taiwan). Despite these relatively high levels of use of fertilizer and irrigation of nearly 80% of the cropped area, yields of food crops in Pakistan are low. Inefficiency in water use is recognized as part of the reason for low yield and is receiving considerable attention as is seed improvement. Evidence indicates much could be done beyond this to increase returns to use of fertilizer. Results from other countries with similar conditions suggest that improvement in fertilizer application methods, rates, and timing can more than double yields with no increase in expenditures for fertilizer.

These potential farm level gains are not the only consideration: fertilizer currently represents a multibillion dollar investment and the largest single use of national gas. In the 1986-87 fertilizer utilized 77,000 MMCUFT gas, which is about 30% of the total gas used; and more than all "other industry" sector. Use of energy on fertilizer production is expected to continue to increase rapidly.

Given this high level of commitment of financial and energy resources to fertilizer, efficiency of fertilizer use should be a major concern; strong measures should be taken to ensure maximum possible efficiency and the highest possible returns from fertilizer and avoidance of methods of use or amounts which may have adverse environmental impact. Such measures should

include as a minimum:

- a) Review of the strategy with respect of fertilizer in the light of present economic conditions; e.g., variations in yield among farmers with different levels and the types of fertilizer and methods of application for different crops, soils and tillage methods. This should include examination of the potential for integrated chemical fertilizer, manure and biological fixation of nitrogen by legumes in rotations to reduce fertilizer costs and increase yields.
- b) Plan and implement a large scale, soundly designed program for on-farm soil test-fertilizer response correlation research for principal soils, crops, areas and growing conditions to provide a basis for making field and crop specific recommendations on fertilizer use based on soil testing.

The program should make maximum use of available data bases including both research and on-farm experience from other countries with comparable conditions. All available data from Pakistan should be collected, evaluated and used along with data from other countries to identify gaps and design on-farm research and data handling programs and develop necessary correlations for guidance in interpretation of soil analysis.

- c) Development of a large and widely available system for provision of soil analysis services and advice on optimal rates and methods of fertilizer application for different crops under different soil, water availabilities and cropping systems. This system should involve both the private and public sectors.

Development of this soil analysis and advisory service should proceed in close coordination with research to develop guidelines for soil sample analysis and recommendations on fertilizer use.

- d) Since optimal fertilizer use is affected by water application, the program should include provision of advice to farmers on water application and improvement in other farming practices along with recommendations on fertilizer applications.

It is difficult to estimate the overall returns nationally to fertilizer applied on the basis of scientifically determined nutrient needs of crops at different stages. However, in developed countries most successful farmers (those who make the highest rates of return) take soil samples on every field before planting each crop season. Private companies provide advisory services on fertilizer application (and in irrigated areas,

water application) and other crop management practice charging full cost of soil and foliar analysis. Farmers buying such services fully expect to recover all their costs and much more in savings on inputs applied and increase in crop yields. Given the present low status of technology employed, the returns, mainly in higher yields, from use of scientific methods in soil analysis and application of fertilizer should substantially exceed the total investment in fertilizer which is expected to be over at least 15 to 20 years. Assistance of the best qualified and most experienced consultants available should be obtained to assess the problem and developed detailed plans to blanket the country with applied research and soil test services. Both public agencies and private companies should be drawn upon both in design and implementation of the program.

The first step, assessment of the need and potential and design of the program, should be completed in 6 months, thus it would be completed before the 1990 PL 480 agreement is being discussed.

Plans for support of the program should be incorporated into the 1990 agreement: in both the self help measures and allocation of local currency. To move rapidly EAD and USAID might agree to allocate some of the fiscal year 1989 local currency to this program as they finalize local currency applications from the 1989 agreement by July 1, 1989.

A long run program goal of 1 billion dollars in combined savings on inputs and increased crop output from fertilizer is suggested (over 15-20 years). Levels of soil testing and use of more scientific fertilizer application on 25% of the total cropped area in 6 years and 50% in 11 years are suggested as interim benchmarks. The first benchmark will be the completion of the study outlined in a) and development of a detailed implementation plan. This will require four to six months. The study should define further steps. Commitment of resources should be made as the plan is completed.

## **B. Vegetable Oil**

The current gap on vegetable oil consumption and production is 800,000 MT per year. The gap is estimated to be growing at about 10% per year. Currently import of vegetable oil costs about \$500 million per year--a level which the country can ill effort to finance. Measures are needed to reduce this heavy FX drain. This can best be achieved by a combination of measures to reduce consumption and measures to increase production.

### **1. Reducing Consumption**

Visual fats and oils in vegetable oil, ghee and dairy products currently provide about 450 calories per day which

is about 20 percent of the total caloric intake. Additional fats are obtained from invisible sources such as red meat, poultry meat, eggs, and cereals. The level has been reached where, from a nutritional point of view, further increase in total fat and oil consumption probably should be restricted to population growth which is 3 percent per year with some allowances for increased consumption among low income groups.<sup>1</sup> This implies about 200,000 MT increase in vegetable oil consumption over the next five years and about 800,000 MT over the next 20 years. Increase in prices is the simplest way to reduce excessive consumption. For most low income groups such price increases should not create a nutritionally serious problem as long as ample supplies of other less costly sources of calories are available. Calories in the form of vegetable oil already cost about twice as much as calories in wheat flour. The major problem is if demand is so inelastic that low income consumers spend much more for oils as prices increase and hence have less to spend for wheat and other lower costs calories.

Excessive consumption among high income groups probably will be affected very little by moderate price increases. Estimates should be prepared on prices required to reduce human consumption of fats and oils by different groups by various amounts and these used in design of price policy. The analysis should include examination of needs for low income groups and measures needed to ensure a minimum levels for vulnerable groups. Increases in vegetable oil prices might be implemented by a tax on vegetable oil.

Additional reductions in apparent consumption or disappearance of vegetable could be achieved by raising prices sufficiently to discourage smuggling of edible oils across the border to India. The amount smuggled is not known but is believed to be substantial; some estimates suggest a 50% increase in oil prices may be needed to eliminate such leakage. This should be analyzed. Another possibility for reducing disappearance of fats and oils is stimulation and support of increased production of detergents to replace some of the edible oils and imported fats going into soap manufacture.

A combination of measures such as these might reduce growth in consumption and other disappearance from 50 percent expected at current rates of growth to about 15 percent over the next five - six years. The problem clearly merits

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<sup>1</sup>. The minimum requirements for fats and oils are much below this level. The maximum recommended level of total calories from fats and oils is 30%.

careful examination of the potential for reducing the alarmingly high past rates of growth in consumption and, the most appropriate means for doing so.

2. Increasing Vegetable Oil Production

Several possibilities exist for increasing vegetable oil production; many of these (with variations) were part of the GOP vegetable oil strategy, developed and promulgated in 1977-78, and of the 1984 oilseed study.

The most obvious possibility is increase in the oil extraction rates from the approximately 3.3 million metric tons of oilseeds presently available annually for processing. While estimates vary, it is likely that the residual oil after pressing averages about 7 percent (Solvent extraction is a small part of the total). Rape and mustard seed extraction rates are estimated to average about 31% from a total of 39% oil content and cotton seed oil 11% out of 18% oil content. Reduction in residual oil by 6 percentage points would increase oil extracted by 200,000 MT per year. This would require major investment in improvement in the processing facilities, better management of processing operations and continued price incentives. Measures to improve cottonseed quality also would be helpful in improving levels and quantity of oil extracted.

Increase in production of non-traditional oilseeds offer substantial potential for increase in vegetable oil production and also for increasing production of oilseed meal required to satisfy a rapidly growing demand for poultry and dairy products. Some analysts have concluded that a) land is a major constraint to increased oilseed production; b) first priority in land use has been production of major crops such as wheat, cotton, rice, and sugarcane, and the many essential minor crops; and c) specialized non traditional oilseed crops are not able to compete with traditional crops for land. These conclusions are being debated. To the extent they are true, windows in existing rotations and unessential fallow period would provide the only important opportunities for increased oilseed production. These need to be identified and quantified and production programs directed to these windows. However, recent information suggests that oil seeds also may compete for land in some areas where yields of major crops are low and perhaps even where yields are at average levels. Thus the potential area for oilseeds may be larger than suggested by windows in rotations and area in unessential fallow.

Several attempts have been made to identify places in the crop rotation and land use patterns where oilseed production are most competitive with other crops for land and water resource availabilities. The following are major possibilities identified:

- a. Soybean and sunflower in cotton-cotton rotations. The estimated potential is over 2 million acres. This involves planting in February with 80 days varieties with harvest by May 31. Most of the progress has been with sunflowers, now 40,000 MT per year. However, soybeans may prove much more competitive when some of the current production problems are solved, particularly the seed viability problem.

Soybean offer the best possibility for introduction in the cotton - cotton rotation because a) they contribute to increased cotton yield and provide some of the nitrogen required by cotton; b) in some areas sunflower is an alternate host, to cotton pests. The right soybean 80-day varieties with inoculum will yield an average of 15 maunds (some 600 kg/acre) which is 560 kg above seed requirements. Several suitable varieties have been tested. If 2 million acres are available as estimated, net production above seed of 1,120,000 MT would be possible. This would add about 200,000 MT of oil (with good processing) and 900,000 MT of soybean meal useful mainly for poultry. This would meet poultry needs for the near future.

- b. Summer soybean and sunflower in areas now in low yielding crops. The potential is estimated to be 1 million acres with potential oilseed yields of 3/4th to 1 MT per acre. The loss of competing crops would be small.
- c. Summer safflower, soybean and sunflower mainly in areas with too little irrigation water to support maize, rice or a good cotton crop. Much of the area under irrigation command currently has a cropping intensity of only slightly above 1.0.

Summer sunflower and soybean can be successfully introduced as substitutes for low yielding irrigated crops and in situations where adequate irrigation water is not available for rice, maize or cotton. The area for the former is estimated at 1 million acres. The area for the latter could total several million acres. Properly managed soybeans require less irrigation than major competing crops. Assuming a conservative 2 million acres half soybean and half sunflower and average yields of 20 maunds, these areas

would provide at least 1.6 million MT of oilseeds which, with proper processing would yield about 400,000 MT of oil (soybean at a 17% extraction rate and sunflower at 33%).

- d. Higher yielding rape seed is another possibility. This would involve developing and planting a cross of Canadian double zero variety with local varieties to increase seed value while maintaining hardiness and increasing yields. As a minimum, the potential is 600-700,000 acres with yields of 15-30 MDS per acre which would produce 400-500,000 MT of additional oilseed. Higher yields are possible also with small application of fertilizer on present varieties, making them more competitive.
- e. Groundnuts appear to offer very little potential. At present the demand for groundnuts for direct consumption is too strong. The price of groundnuts is near the price of edible oil (Rs.1,200-1,300 per kg). However, groundnuts for direct consumption should be encouraged for their high nutritional value.

Three of these possibilities together offer a rapid potential for increasing oil production by about 950,000 MT per year as follows: a) improved processing of present oilseeds - gain 200,000 MT or more; b) spring soybean and sunflower mainly in cotton-cotton rotation - 200,000 MT (1 above); c) Summer soybean and sunflower on fallow, water short, or otherwise low yielding lands (2 and 3 above) - 550,000 MT. Together these would save about \$600 million per year in FX for oil imports alone. Based on our successful experience in Brazil in the 1960's and early 1970's these achievements could come very rapidly if properly planned and implemented.

Vegetable oils should be addressed as part of a larger integrated program for vegetable oil, feed and livestock. Some of the necessary conditions have been established. These include fairly free pricing and trade in oils and oilseeds and fairly free private sector entry into oilseed and vegetable oil processing. Prices have reached levels where improved processing is profitable. However, considerably more progress is needed on a) development of a large scale, efficient, quality-conscious feed industry which will provide a good market for quality oilseed meal (with meal prices competitive with oil cake) and the basis for expansion in poultry and dairy production; b) development of improved production and marketing of poultry and dairy products, c) development of modern soybean and other oilseed processing plants; d) development of local seed supplies for soybean and sunflower which ensure seed

quality and viability; e) the vertical integration of oilseed marketing, processing, feed industry and poultry and dairy production and marketing.

Potential returns for oilseed appear favorable if the necessary supporting activities are implemented in a coordinated fashion. Historically soybeans sell on the world market at about twice the price wheat and 2.5 times the price of maize. Currently rape seed sells on the Pakistan market for an average of about 2.5 times the price of wheat. Cottonseed of generally poor quality sells on the market for slightly over the price of wheat. Current prices of oil and soybean meal for poultry should provide soybean prices of 2 to 2.5 times the price of wheat if adequate volume and proper processing facilities are available. This would give very good returns on soybean and production compared with competing crops. However, as was found in Brazil other necessary conditions must be established to achieve rapid rates of expansion in soybean production (or other traditional oilseeds) in new areas. This includes quality seed, assured markets, technical information, suitable harvesting equipment and inoculum for soybeans. A soundly designed and implemented private sector agribusiness program to expand oil seed production and processing integrated with a livestock and feed industry as suggested should provide an increase in value of oil of at least of \$500 million per year within the next 20 years with very little negative impact on any other major crops. Impacts on animal production of improved feed supplies and other conditions would be much more important than this. In 20 years, demand for dairy and poultry products is estimated to be about 7 billion dollars per year greater than 1988 levels (in constant 1988 dollar terms).

A major program addressing the oilseed deficit and contributing to feed supplies for poultry and dairy cattle would fit with and complement several existing U.S. assistance activities.<sup>2</sup>

- The PL 480 program of the past several years with its emphasis on freeing up the vegetable oil market and increased private sector involvement in oilseed and vegetable oil trade and processing
- Improvement in the commercial seed production which is a current PL 480 SHM.

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<sup>2</sup>. Major elements of the required oilseed-livestock program were identified in the 1984 oilseed study, page 24 to 27.

- The agribusiness development project: The new agribusiness studies might, in fact, focus on and support vertically integrated private sector development of: a) oilseed processing (and thereby stimulate and support on-farm production); b) feed manufacture for dairy and poultry; c) improved processing and marketing for both the dairy and poultry sectors.

**C. Demand for Dairy Products**

Milk production per capita appears to have declined substantially in the past couple of decades. Most of the decline has taken place in milk used to produce desi ghee. This decline has been a significant factor in past rapid growth in demand for vegetable ghee. The potential for such future shifts is much less now than 20 years ago. As a result, demand for vegetable oil should grow somewhat less rapidly. Change in future dairy production then will be based increasingly on demand for fluid milk and for manufactured milk products other than butter oil (desi ghee). This would have two important implications.

1. Total demand for milk would grow more rapidly in the future since there will be less shift from use of available milk for fat to use for fluid and other non ghee products.
2. There would be a shift in demand at the farm level from higher to lower fat content milk (from buffalo milk of 6+% to milk from cattle with typically 3.5 and 4.0% butter fat content). If consumer preference follows patterns in other countries fluid milk with well below 3.5% may soon become popular (e.g. 0.5 to 2.0%). Animal breeders should be alert to such trends as should dairymen and feed manufacturers.

The dairy industry will need to undergo major changes to meet future demands, including growth in demand for fluid milk and related milk products with lower fat content. The dairy industry will require much better organization and greater efficiency from cattle breeding through dairy herd management, and milk collection, processing and marketing. Reduction in cost and better methods of collection, processing and distribution will be essential to satisfy a much larger, more sophisticated market. Cost reduction is essential. Currently reported farmers receive Rs.2.8 per litre for 6% milk which plants blend with very low cost imported dried milk and sell at Rs. 8 per litre.

**D. Changes in Poultry Production and Demand**

Modern poultry production has expanded rapidly from its start in the early 1960s. Currently consumption of poultry meat is restricted to about 1 kg/capita per year--about 10 percent as much as consumption of red meat (cattle, buffalos, sheep and goat). Egg consumption also has increased rapidly since introduction of a modern poultry industry and now averages about 40 eggs/capita per year--about 2 kg/capita per year. Consumers continue to have a strong preference for desi poultry meat and eggs. Recently desi poultry meat sold for about 50 percent more than the price of the meat from modern broiler systems, up from a differential of only 10-15 percent in 1976-78. In 1985 desi eggs were about double the price of eggs from commercial layer flocks up from about 20 percent differential in 1976. The increased differentials are associated with increases in commercial egg and broiler production of about 400% between 1976 and 1985. While Consumers prefer goat, lamb and mutton, over poultry, poultry appears to be the only possibility for major increases in domestic meat production to meet increasing demand resulting from increasing levels of income, per capita. In other countries poultry production has expanded very rapidly from the situation as in Pakistan where the basis for a rapid expansion already exists. Several major layer and broiler breeding lines, hatcheries and a substantial nucleus of fairly large scale commercial broilers and egg producers already exist. However, major problems still exist. The most serious of these are:

1. Inadequate supply of quality feeds - Problems exist for both the principal ingredients (1) a high energy source such as yellow maize which normally makes up about 2/3rd of the total volume (2) high quality protein supplements such as soybean meal and animal protein which constitute 20 to 25% of the total. Alfalfa leaf meal or other leaf meal which is important in the diet and helps give an attractive yellow color to egg yolk is not available locally;
2. A well organized marketing system which insure a high quality product, low distribution costs and promotes poultry consumption.

Both feed supply and marketing will require major attention if poultry is to enjoy a continuing rapid and profitable growth and supply the major part of the growing demand for meat. Based on patterns in other countries at a similar stage, production and consumption of poultry meat could increase to match levels of red meat over the next two decades. That would mean roughly a 15 percent per annum growth rate over the next 20 years and expansion in production to a level of over 1 million MT per year by 2008. This is a growth rate similar to the past 15 years

(see following table). Even this rate of growth may be conservative if population continues to grow at 3 percent per year and GNP at 7 percent per year.

**PRODUCTION OF EGGS AND CHICKEN MEAT, 1970-85**

<b>Year</b>	<b>No. of Eggs (million)</b>	<b>Chicken Meat (1) (tons)</b>
1970	140.40	3099.000
1971	191.40	3523.000
1972	209.00	4025.000
1973	246.40	5250.000
1974	220.00	6205.000
1975	528.00	7350.000
1976	624.00	8244.395
1977	730.62	9844.896
1978	1038.84	12352.152
1979	1079.10	12838.689
1980	1229.20	20215.812
1981	1223.20	20215.812
1982	1823.80	30202.249
1983	1584.00	25887.826
1984	1738.00	27828.620
1985	2018.72	38481.271

Source: Pakistan Poultry Association.

**VI. DEVELOPMENT OF AN INTEGRATED OILSEED, OIL, FEED, POULTRY AND DAIRY PROGRAM**

It is recommended that USAID through PL-480 and other activities support a major integrated oilseed, vegetable oil, feed, poultry and dairy production and marketing effort. This should include:

1. Study to identify: a) areas and cropping systems which permit more intensive use of land and water resources; b) crops and cropping systems which lend themselves to cropping intensification; c) requirements of farmers in the way of rotations, cropping systems and incentives to increase intensity of cropping; d) estimates of areas susceptible to alternative improved rotations and intensified cropping (including crops and varieties best suited to new rotations). This study component would not have exclusively an oilseed focus; oilseeds would be included among crops considered.
2. Under ongoing projects such as the agribusiness project, emphasize and support private sector development and vertical integration of oilseed processing, feed manufacture, and improved poultry and dairy marketing and increase in production through a variety of arrangements from simply assisting with feed and other inputs to contracting of production. Production contracting is likely to take place mainly with broilers and eggs and very little with dairy production. However, some integration of dairy production following the Indian model might be promoted. The US might specifically assist with small farmer dairy development in the Indian model with PL-480 self help measures and local currency.
3. Support Private Sector seed production as a follow-on to self help measure No. 5 of the 1988 and 1989 agreements. Support could be provided through the agribusiness project, research activities and perhaps with local currency and the CIP. Emphasis would be on development of private sector commercial production of crops and varieties that best fit into more intensive cropping systems.
4. Development of production of leaf meal concentrate from berseem or leucerne. This is a very important ingredient for poultry, but not now available locally.

The study called for in self help measure 6 of the 1989 agreement should examine possibilities and make specific recommendations for major integrated programs in oilseeds, vegetable oil, feed, poultry and dairy. The study should define precisely which elements will be supported by the US and by other donors, define inputs and outputs, implementation schedules and progress benchmarks.

Given the importance of the information on potential areas, crops and cropping systems for increased cropping intensity, this special study

suggested earlier should be commissioned immediately supported with available USAID resources. It should include substantial involvement of MFA and provincial agricultural departments and include personnel who have had experience with this type of study and planning in other countries. The broader program planning activity should include people with experience in large scale development of integrated oilseed, feed, livestock program of the type proposed.

The study of the Joint Work Group should be initiated by November 1988, to be completed before discussions are underway on the 1990 PL-480 agreement (by May 1989). Appropriate implementation plans and schedules should then be incorporated in the 1990 agreement, coordinated with other USAID and GOP activities.

**VII. ISSUE OF U.S. SUPPORT OF OIL SEED PRODUCTION**

The issue of U.S. support of oilseed production has been raised previously and must be resolved. The simplest approach would be for AID to avoid direct support of oilseed production and concentrate on a) land resources available, planning and policy analysis; b) guidance and support of private sector agribusiness investment in oilseed and vegetable oil processing, the feed industry and improved poultry and dairy production and marketing both as single level activities and as vertically integrated activities; c) continued support of development of a private sector seed industry. Direct promotion and financial support of oilseed production would be largely in the hands of the private sector with support and encouragement from the GOP and the other donors.

The other alternative is to take on the lobbyists in U.S. where chances of winning after the election may be good.

## ANNEX I

### Estimated Increase in Value of Poultry and Milk Required in 20 Years

If supplies permit, consumption of animal products will expand rapidly over the next 15 - 20 years in response to increasing disposable income and a population growth rate that probably will remain near 3%. Even a gradual decline over 20 years to a 2% growth rate would still result in a population in 20 years of about 170 million compared with 103 million in 1988. With continued increase in per capita income, demand for meat and milk products would at least double in 20 years bringing total meat consumption to 2.2 - 2.4 million metric tons and milk to about 25 million metric tons and egg consumption to at least 8 billion eggs (500,000 metric tons of eggs). Consumption of poultry meat then likely will be in excess of 1 million metric tons given the potential efficiency in production and costs, compared with production and costs of red meat and limited potential for increase in red meat production. Together poultry meat and eggs would be at least 1.5 million M.T. Feed requirements for poultry then would be about 5 million M.T. (about 1 million M.T. of protein supplement, 3.5 million M.T. of maize and related energy feed and 50 - 100,000 M.T. of leaf meal).

The retail value of the poultry and dairy products required in 20 years is estimated, as follows (in 1988 dollars).

	Total	Value of increase over 1988
8 billion eggs at \$0.80/doz.	\$ 534 million	\$ 277 million
1.1 m. M.T. of broilers at \$1.50/Kg.	<u>\$1,650 million</u>	<u>1,500 million</u>
Total	\$2,184 million	\$1,777 million
Milk production 25 m. MT at retail price of \$.40 per liter	<u>\$10,000 million</u>	<u>\$5,000 million</u>
Total	\$12,184 million	\$6,777 million

Thus the value of increase in poultry and milk production at retail level would be about \$6.8 billion. If most of the inputs can be produced locally the total increase in poultry and dairy contribution to GNP including value added in processing and marketing would approach \$6.8 billion. The increase the farm level would be about 60% of this--about \$4.08 billion which is about 70 per cent of current GNP at the farm level. Thus poultry and dairy, if properly supported with domestically grown feeds, would contribute 2.5 % annually to the rate of growth of GNP in agriculture starting from the 1988 base of about \$6 billion GNP in agriculture.

## ANNEX II

### Notes on Oilseed Production from the 1984 Oilseed Study

The 1984 Edible Oilseed Industry study estimated that compared with "current" prices a Rs 15/Kg increase (to prices in India) would result in:

- A 6% decline in ghee consumption and a 61% increase in cooking oil consumption.
- A 60% increase in vegetable oil production in 3 years which would save \$392 million in FX. How this would occur is not clear. (See P. 4).

Major problems identified were:

- Price controls on edible oils that kept prices below world levels.
- Government domination of oil processing.

Other problems:

- Government commitment to buy non traditional oilseed at established support prices were not fully met. (This was part of announced GOP policy and the strategy developed in 1977.)
- Government domination of oilseed processing including the Ghee Corporation monopoly on cotton seed oil purchasing.

The additional crop area estimated in the study potentially available for oilseed production was as follows:

Dobari lands (rice land idle in the rabi season	1.9 million ha.
Cotton fallow (available for late winter oilseed)	2.2 million ha.
Rainfed, riverine, etc.	<u>6.0 million ha.</u>
Total	10.1 million ha. <sup>3</sup>

In addition to this area, studies under the AID Water Management Project identified large areas, mostly at the end of the watercourse, not cropped mainly due to losses in water delivery and excessive water application. Such estimates of land availabilities are supported by a review of aggregate data on land available, land irrigated and land cropped.

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<sup>3</sup>. Even if only half the area of 5 million hectares were planted to oilseeds with yields of 1.25 M.T./ha, total increase in production would be 6 million M.T. which processed would provide 1.1 to 1.5 million M.T. of additional vegetable oil (depending on the mix of soybeans and sunflower, the two main non-traditional oilseeds).

### Land Potentially Available for Oilseed Production

Area cultivated and area in current fallow have changed very little in Pakistan since 1965. Data are shown below in millions of hectares.

	<u>1965-66</u>	<u>1986-87</u>
Area irrigated	11.48	16.06
Current fallow	5.31	5.26
Net area sown	<u>13.93</u>	<u>15.54</u>
Total area cultivated	19.24	20.80
Area sown more than once	1.61	4.55
Total cropped area	15.54	20.09

(Source: Economic Survey of Pakistan, 1987-88, Pp. 29 and 41.)

The major increase in area cropped has come in areas sown more than once (from 1.6 to 4.5 million hectares), but even with this almost 200% increase, total cropped area sown has increased by only 30% in 21 years. These data indicate cropped area is less than "total cultivated area including fallow." Thus implicitly cropping intensity was only about 0.96 despite area covered by all forms of irrigation that is over 75% of total cultivated area (16.1 million hectares out of 20.8 million hectares).<sup>4</sup> The increase in area cropped is almost exactly matched by increase in area irrigated, implying that the increase in the area irrigated on average has contributed only one crop per year to total cropped area.

Growth in animal numbers suggests that much of the increase in potential area cropped has been used for grazing. From 1965 to 1980, number of grazing animal units has increased by about 50%, mostly buffalo, sheep and goats. Growth in cattle numbers, which was rapid from 1954 to 1965, has slowed greatly since, apparently as tractors have replaced cattle used for draft power. Currently 40% of the land is plowed with tractors. Buffalo, kept mainly for milk, increased by 55% from 1962 to 1987 and sheep and goats, kept mainly for meat, increased by 140%.

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<sup>4</sup>. Economic Survey of Pakistan, 1987-88.

Livestock on Farms (in millions of head)

	<u>1965-66</u>	<u>1987-88</u>
Buffalo	8.9	14.0
Cattle	15.6	17.2
Goats and sheep	25.5	60.5
Camels, donkeys, horses	2.8	4.5

(Source: ibid. P. 49)

<u>Animal Products Produced</u>	<u>1971-72</u>	<u>1987-88</u>
Beef	346,000 M.T.	595,000 M.T.
Mutton	200,000 M.T.	570,000 M.T.
Poultry meat	14,000 M.T.	134,000 M.T.
Eggs	583 million eggs	4,140 million eggs
Milk	7,800,000 M.T.	12,900,000 M.T.

(Source: ibid. P. 50.)

Grain production has increased by about 180% in the 1971-72 to 1987-88 period. While shorter grain varieties has meant less bhoosa per ton of grain, bhoosa (and other grain residues usable for feed) probably has kept pace with increase in forage consuming livestock numbers, but area left in fallow usually used for grazing clearly has not. Thus, there is considerable pressure on such available grazing land. Efforts to expand oilseed production by using land in annual or seasonal fallow must contend with this competition from livestock. However, it is likely that in many situations residue from an oilseed crop grown in the space otherwise left in fallow may provide as much feed as the same area left in unplanted fallow. This should be verified. Opinions vary widely as to the extent of land available for planting to more traditional oilseed crops such as sunflowers and soybeans and to improved varieties of rape and mustard (e.g., introduced double zero varieties crossed with local varieties). A careful survey in different areas is needed to provide direction for public and private efforts to expand production of different crops. Such a survey should identify potential land areas and water available and also assess farmer acceptance of alternative new crops and cropping systems.

Potential for changes in food consumption habits also should be analyzed (e.g., substitution of milk, poultry meat and eggs for red meats). Milk production is likely to be more competitive than red meat for a given amount of ruminant livestock feed. Thus, competition at the margin may be mainly between land for livestock to produce red meat and land to produce oilseeds and maize as intermediate products and vegetable oil, poultry meat and eggs as final products. Experience in other countries suggests that if the oilseed, maize, feed, and poultry sectors are well organized, the returns and hence the outcome favor such products over use of the land for red meat production. The question then is mainly whether Pakistan can and will provide the policy environment and support needed to permit the private sector to develop its oilseed, maize and poultry potential. The recent

policy changes favoring free pricing of oilseeds, vegetable oil and other commodities and freedom of the private sector in these areas offer substantial scope for expansion in oilseed, maize, feed, poultry and dairy production. Major elements of an oilseed production and marketing program were identified in the 1984 Oilseed Industry Study (Pp. 24-27).