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PROJECT APPRAISAL REPORT (PAR)

PROJECT NO. 511-11-190-364.5	PAR FOR PERIOD 2/1/74 to 6/30/75	COUNTRY Bolivia	PAR SERIAL NO. FY 1976-5
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CEREALS DEVELOPMENT

6. PROJECT DURATION: Began FY 1969 Ends FY 1975	7. DATE LATEST PROP Sept. 3, 1969	8. DATE LATEST PIP May 30, 1970	9. DATE PRIOR PAR January 31, 1974
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$ 2,132,000	b. Current FY Estimated Budget: \$ 0	c. Estimated Budget to completion After Current FY: \$ 0
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME Utah State University	b. CONTRACT, PASA OR VOL. AG. NO. AID/511-64T
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I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
USAID	AID/W	HOST		
			<u>SUMMARY STATEMENT</u>	
			<p>I. <u>Background</u></p> <p>This project (511-11-190-364.5) began in FY 1970 under the project title of Cereals Development with emphasis given to increasing wheat production. Prior to this project, a significant number of USAID activities had contributed directly or indirectly to increasing cereal production and Bolivia had become self-sufficient in rice and corn at the current levels of consumption.</p> <p>Clearances: RDD: JRMoffett ADP: AHBoehme AD: CJStockman</p>	

D. REPLANNING REQUIRES

REVISED OR NEW: PROP PIP PRO AG PIO/T PIO/C PIO/P

E. DATE OF MISSION REVIEW

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE
 RDD: William H. McCluskey

MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE
 John R. Olsson

6-4-76

James M. P. J. 1976

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The production of wheat, however had declined from an estimated 55.2 thousand metric tons in 1963 to a low of 27 thousand metric tons in 1967. In spite of studies conducted in 1962 and 1966 that concluded Bolivia would not likely ever reach self-sufficiency, the concern over the decline prompted development of a wheat project as part of the USAID-Bolivia/Utah State University Contract in FY 1966. The University was charged with administrative responsibility for a cooperative program with the MACA to increase wheat production to fifty percent self-sufficiency by 1975. Improved Mexican dwarf varieties were introduced, seed multiplication undertaken and research initiated in cultural practices, including fertilizer trials. In 1970, domestic production was estimated at 44.1 thousand metric tons.

In FY-70, the Cereals Project was formalized and initiated as a vertically integrated project. Four additional advisors (extension, fertilizer, agronomy and a part time economist) were added to the on-going seed specialist and three general areas of work defined. These were (a) improved seed and farm management practices, (b) formal research activities and (c) institution building and marketing.

II. Major Accomplishments

During the life of the project production of wheat averaged 41.9 thousand metric tons over the period 1966-1970 and 56.6 thousand between 1971-1975. Of this approximately 95% of the increase is attributed to increases in yields and 5% to cultivation of new acreage. The project achieved an average increase in yields per hectare of over 30 percent in the traditional producing area which predominantly consists of small producers. However, the increased yield per hectare permitted these producers to meet their consumption needs on less land and they turned to competing crops of potatoes and corn which provide a higher net return, thus precluding a more satisfactory supply response leading to increased off farm sales of wheat.

Domestic production has shown an overall increase, from 44.1 thousand metric tons in 1970 to 69.1 thousand metric tons in 1975. This represents approximately an 8 percent increase in the volume of total consumption that is produced domestically.

Although the overall results, as measured by increased production, may be termed marginally to moderately successful, the program has provided advances which are

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important to any future efforts to increase wheat production. These are:

1. Upgrading the Bolivian capability for applied research, both in trained personnel as well as in establishing a basic gene pool from which future breeding may proceed.
2. Improving the technical capability of the MACA staff to analyze the production and marketing aspects of selected agricultural commodities.
3. Establishment of a soil sampling and testing process with a system to return the results to farmers in the form of fertilizer recommendations.
4. Adapted wheat varieties for various wheat production areas were identified.
5. Winter wheat production was introduced into the sub-tropical low lands. Plantings have increased from zero hectares in 1969 to over 4,000 hectares.
6. Over 4,000 wheat varieties and lines have been tested at various experiment stations.
7. The seed processing plant and seed laboratory in Cochabamba are in operation with trained personnel. Seed cleaning operations are also carried out in four other locations.
8. Adequate supplies of improved seed have been made available through the seed program and an estimated 38 percent of the wheat is now seeded to improved varieties.
9. The in-country milling capacity is presently adequate to meet the needs for milling both domestically produced as well as imported wheat.
10. A successful market was developed for the economic use of mill by-products.
11. Extension agents are better prepared to teach wheat production practices to farmers.

III. Short-Falls

1. The original goal of achieving 50 percent self-sufficiency by 1975 has proven to be overly optimistic. The project was unable to develop a new wheat technology for Bolivia which would have significantly broken through

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the present levels of yields per hectare. The proportion of total consumption produced domestically remains at about 25 percent, suggesting a continuing need for import substitution if self-sufficiency remains a valid objective.

2. The level of technical assistance to farmers by the MACA Extension Service has been inadequate. This has been due to inadequate operational funds to support salary increases, field work by agents and research activities. Although salary increases were granted in 1974, they remain below those in some Ministries, the private sector and in some projects funded by international lending organizations, making it difficult to recruit and retain well qualified personnel. However, budget proposals submitted as part of the conditions precedent for Loan 053 show substantial increases for the years ahead and equipment to be provided under the loan should contribute greatly to eliminating previous constraints.

3. Official wheat prices remain insufficiently flexible to reflect frequent price changes in the world wheat market. Thus, wheat mills frequently find it more advantageous to import. However, the reorganization and improvement of the MACA offices of Planning-Statistics-Economics and Marketing hold promise that the GOB will become more aware and sensitive to the need for more relevant pricing policies. It must be recognized however that an incentive price to the small farmer may necessitate some level of subsidization.

4. The seed organization is functioning moderately well in production of improved seed, but it has not yet reached the level of performing certification functions due to insufficient technical personnel, budgetary support and most importantly a lack of appreciation for the value of certified seed on the part of the producers.

5. The National Wheat Committee has failed to systematically function as originally envisioned.

6. The Wheat Institute, although functioning, has not had a dramatic impact upon wheat production. This may be due in large measure to the shortage of human capital, but it is partially due to duplicating functions performed by various sections of MACA, thus failing to stimulate an overall integrated effort. At this time, the GOB is considering the advisability of its being continued.

7. There remains a shortage of storage facilities and no standards for grading grain have been adopted by the GOB.

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In conclusion the wheat program has not been the significant success envisioned at the beginning that proposed a fifty percent self-sufficiency level. However, during the program period production increased, reversing the earlier downward trend, and this may have prevented a more desperate domestic situation.

IV. Lessons Learned

The suggestions summarized below are based on the experience gained from this project:

1. That the potential for introducing a viable technology into a subsistence environment depends upon developing a technology that is compatible to the small farmers objectives and feasible within his physical, economic and cultural capabilities. The development of such a technology has proven to be an elusive objective for the cereals project and would seem to require more time, effort and funds than has generally been recognized.
2. That many of the traditional farming areas are characterized by extremely limited land areas per farm, limited soil potential and poorly developed infrastructure. Such an environment limits the potential for introducing viable new technology. Hence, if the primary goal is increased production greater attention should be given to projects in the lowlands where physical and climatic factors provide greater potential.
3. That a relevant technology without an appropriate set of institutional policies especially in support of the research function and the need to extend results to the small farmers to ensure profitable adoption may not result in increased production.
4. That an administratively determined price policy which is not sensitive to external marketing forces, especially imports (contraband or otherwise) discourages Bolivian millers from purchasing domestic production.

V. Recommendations

1. That USAID/Bolivia bring to the attention of the GOB the following recommendations:

a. There is a need for establishing a price policy that is flexible and sensitive to external market forces but one that will serve as an incentive to producers if increased wheat production is to remain a national goal. However, it should be recognized that total self-sufficiency may not be a realistic goal given the

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comparative advantage for alternative domestic crops and international competition.

b. Imports should be scheduled so they do not interfere with the internal marketing schedules of farmers.

c. Increased attention could be given to blending other domestically produced products with the wheat flour so as to maximize the use of domestically produced ingredients without a detrimental influence on nutrition. Yucca flour, quinoa flour and corn meal are potential substitutes.

d. The ability to supply quality technical services in a timely fashion was proven to be critical to achieving increased yields among small farmers. Specifically, there were bottlenecks caused by a lack of trained people particularly in extension but also in Research and the Office of Marketing. The budget system failed in two ways: First adequate funding was not provided, and secondly the funds allocated were not released in timely fashion. Hence, attention should be given to increased training of various types (in-service, short-term, long-term) spanning the spectrum from research/extension thru economics/marketing. Equally important is the implementation of a budgeting/expenditure system that makes adequate funds available for field support in a timely manner.

e. The physical constraints within the traditional wheat areas, especially the very limited quantity of arable land per farmer, imposes very real impediments to large increases in wheat production within those zones. However, there may be significant potential for increased production within the low-land regions if current technology constraints can be resolved. To that end, it is recommended that increased efforts be focused upon investigating the feasibility of double cropping under natural rainfall as well as under irrigated conditions in the low lands.

f. Recognizing that wheat production is not currently competitive to alternative crops, due in part the low yields, it is recommended that increased efforts be devoted to cross-breeding and selection in order to increase the probability of a genetic break through that might make wheat economically competitive.

g. The GOB should adopt a national standard for weight and quality grades of wheat.

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h. It is recommended that MACA increase the budgetary support, the number of technicians, and training of technicians in the Commercialization Department to effectively utilize data from the sample frames being developed.

i. USAID should assist develop a new wheat strategy paper for use by the GOB in developing their political strategy to supply internal demand for wheat over the next several years.

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II. PERFORMANCE OF KEY INPUTS AND ACTION AGENTS

A. INPUT OR ACTION AGENT CONTRACTOR, PARTICIPATING AGENCY OR VOLUNTARY AGENCY	B. PERFORMANCE AGAINST PLAN							C. IMPORTANCE FOR ACHIEVING PROJECT PURPOSE (X)				
	UNSATISFACTORY		SATISFACTORY			OUT-STANDING		LOW		MEDIUM		HIGH
	1	2	3	4	5	6	7	1	2	3	4	5
1. Utah State University				X								X
2.												
3.												

Comment on key factors determining rating

Contract personnel worked in close harmony with MACA counterparts developed relevant training programs for local staff and farmers and submitted timely reports which included valid recommendations. For the most part, the contractor personnel were well qualified, arrived in timely fashion and were well supported by their home office. A more forceful leadership in research would have been desirable.

4. PARTICIPANT TRAINING	1	2	3	4	5	6	7	1	2	3	4	5
			X									X

Comment on key factors determining rating

Prior to 1971, 6 Bolivians had been sent abroad for training on cereals related programs. After 1971, 8 additional technicians were sent abroad for graduate training. Six of the 8 trainees are currently employed by MACA in responsible research assignments. Two have not yet completed their training abroad. In addition, 38 nationals were supported for in-country thesis and research programs. (continued next page)

5. COMMODITIES	1	2	3	4	5	6	7	1	2	3	4	5
					X					X		

Comment on key factors determining rating

Commodities were utilized as intended.

6. COOPERATING COUNTRY	a. PERSONNEL	1	2	3	4	5	6	7	1	2	3	4	5
	b. OTHER			X									X

Comment on key factors determining rating

- a. Personnel. The lack of a sufficient number of technically qualified GOB personnel to properly staff all essential activities served as a serious constraint. The lack of cooperation and coordination between various GOB entities at the upper levels inhibited achieving maximum results.
- b. Other. Inadequate funding to support increased field work and more extensive research reduced the effectiveness of the program. The lack of a flexible pricing policy that would encouraged farmers served as a negative factor.

7. OTHER DONORS UMDP	1	2	3	4	5	6	7	1	2	3	4	5
					X				X			

(See Next Page for Comments on Other Donors)

4. PARTICIPANT TRAINING

Comment on key factors determining rating (continued)

Additionally, an in-country professional training program was initiated in 1971 as part of the effort to provide personnel capable of managing a national wheat program and its related institutions. The cost of this program was cooperatively supported by both the cereals development and sheep contracts. No separate accounting was attempted. Formal course instruction was given in a variety of subject matter areas related to agricultural development and wheat production. Courses were offered on an intensive basis by contract personnel and by professors from the Utah State University Campus. University credit could be earned. The total program involved 29 courses, 9 of which were in the areas of plant and soil sciences. The specific courses taught were as follows:

	<u>Number of Participants</u>
A. Plant and Soil Sciences	
1. Wheat Production and Programming	88
2. Introductory Soils (SS 358)	54
3. Forage Crops (PS 432)	31
4. Soil-Plant Relations (SS 555)	35
5. Tropical Soils (SS 515)	35
6. Irrigation and Drainage	31
7. Range and Ecology (RS 298)	27
8. Field Plot Techniques	27
9. Range and Watershed (becarios)	<u>5</u>
Total Participants	333
B. Agricultural Development	
1. Ag. Planning and Project Evaluation (non-credit)	41
2. International Ag. Development (AE 580)	22
3. Advanced Ag. Development (Econ 680)	31
4. Price Theory (AE 501)	19
5. Farm and Ranch Management (AE 515)	27
6. Ag. Credit (AE 532)	19
7. Ag. Marketing (AE 560)	39
8. Livestock Economics (AE 517)	37
9. Research Methods (AE 606)	84
10. Pedagogy (ED 656)	<u>31</u>
Total Participants	350
C. Staff Capacitation	
1. Public Administration	30
2. Organizational Development	143
3. Home Agent Capacitation	30
4. Bank Agent Training	55
5. Extension Methods	120
6. Cultural Change (SOC 330)	27
7. Program Development	<u>61</u>
Total Participants	466

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4. PARTICIPANT TRAINING

Comment on key factors determining rating (continued)

While progress was made under the contract in training and instruction, the lack of sufficient qualified personnel still significantly constrains the OOB wheat program and requires priority attention.

Finally, the number of participants trained was inadequate relative to the need for human capital. English language training also was inadequate for those trained in the United States.

11. 7. Continued; Comment on key factors determining rating of Other Donors
The variety testing program in the ONDP Abapo-Izozog Pilot Irrigation Project continues with major emphasis upon varietal performance under irrigation in the winter dry season (May-September). Should this project successfully demonstrate the feasibility of double cropping winter wheat in combination with summer crops, an additional 30 to 50 thousand hectares could ultimately be available for winter wheat production. However, such a capital investment does not appear likely to involve small producers within the near future.

III. KEY OUTPUT INDICATORS AND TARGETS

A. QUANTITATIVE INDICATORS FOR MAJOR OUTPUTS		TARGETS (Percentage/Rate/Amount)					END OF PROJECT
		CUMU- LATIVE PRIOR FY	CURRENT FY 76		FY ____	FY ____	
			TO DATE	TO END			
MAGNITUDE OF OUTPUTS							
1. 3 trained planners available by 1975 to staff the MACA Planning Unit.	PLANNED	3					9
	ACTUAL PERFORMANCE	9					
	REPLANNED						9
2. 2 trained co-op specialists in Banco Agrícola Boliviano training others in organization and operation of co-ops.	PLANNED	2					12*
	ACTUAL PERFORMANCE	12*					
	REPLANNED						12*
3. National Director of MACA seed program. 1 lab director, 1 lab supervisor, 5 area supervisors.	PLANNED	6					6
	ACTUAL PERFORMANCE	6					
	REPLANNED						6
4. 2 MACA seed processing plants operational by 1975.	PLANNED	2					2
	ACTUAL PERFORMANCE	2*					
	REPLANNED						2**
B. QUALITATIVE INDICATORS FOR MAJOR OUTPUTS							
1. Twenty-five trained provincial extension personnel, 5 departmental and one national on the job.	COMMENT: Thirty-two extension agents are working in the wheat areas and the majority received training in production techniques, credit, and extension practices by participation in short courses taught by contract and MACA personnel. Three received long term training related to the wheat program and are working in that area today.						
2. MACA Information Center.	COMMENT: MACA continues to operate an information center capable of producing publications at various levels of technology. (For details on the printing plant see the previous PAR). The quantity of publications has been limited due to inadequate budgetary support.						
3. MACA Cereal Lab Operating	COMMENT: The building has been completed and partially equipped and one trained technician is employed. The laboratory is not effectively functioning as yet.						

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* The Banco Agrícola does not have trainers in coops but there are 12 MACA specialists serving coops.

** A second seed processing plant in Santa Cruz is operating but needs a number of improvements which will be made by MACA under the Ag. Sector 1 Loan.

II. 7. Continued: Comment on key factors determining rating of Other Donors

III. KEY OUTPUT INDICATORS AND TARGETS

A. QUANTITATIVE INDICATORS FOR MAJOR OUTPUTS		TARGETS (Percentage Rate/Amount)					END OF PROJECT
		CUMU- LATIVE PRIOR FY	CURRENT FY		FY ____	FY ____	
			TO DATE	TO END			
5. 4 research personnel testing new varieties by 1975.	PLANNED	4			1		5
	ACTUAL PERFORMANCE	4					
	REPLANNED						4
6. Credit manual produced in BAB.	PLANNED	1					1
	ACTUAL PERFORMANCE	1					
	REPLANNED						1
	PLANNED						
	ACTUAL PERFORMANCE						
	REPLANNED						
	PLANNED						
	ACTUAL PERFORMANCE						
	REPLANNED						
B. QUALITATIVE INDICATORS FOR MAJOR OUTPUTS	<p>4. Research being carried out by trained Bolivian personnel in production, marketing and consumption.</p> <p>COMMENT: For the past five years, much of the effort in wheat research has been devoted to annually testing 2,000 to 4,000 lines of various varieties, principally for resistance to rust. Since the principal beneficiaries of these tests have been breeding stations in more advanced countries, the decision has been made to reduce this program and focus more efforts upon cross-breeding. This should enhance the probability of finding one or more desirable combinations for improving yields which would impact more favorably upon increasing domestic production. There is a need for more studies concerned with management-cultural practices appropriate for small producers as well as for greater emphasis upon winter wheat production in the lowlands.</p> <p>Research in production, marketing and consumption has moved ahead very slowly but reorganization of the Planning-Statistics-Economics and Marketing offices warrants guarded optimism that this general area will be significantly improved in the next two years.</p>						
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IV. PROJECT PURPOSE

A. 1. Statement of purpose as currently envisaged.

2. Same as in PROP? YES NO

To develop an operational vertical wheat program through upgrading and coordinating existing institutions which can serve as a model for other programs.

B. 1. Conditions which will exist when above purpose is achieved.

2. Evidence to date of progress toward these conditions.

1. National Wheat Committee organized and coordinating Vertical Wheat Program.

1. A National Wheat Committee was organized to coordinate the Vertical Wheat Program, but as reported in the last PAR, there was a serious lack of coordination between National level offices/entities and activities at the state and county level.

2. National Extension Service equipped and operating in 25 centers with 31 trained personnel.

2. There has been no major changes since the last PAR and the comments are included for the convenience of the reader. There are 32 agents working in 24 centers that have received in-service and short-course training in subjects relevant to increasing wheat production. Inadequate funding has seriously restricted field work and the number of farmers that could be served. Equally relevant is that 32 agents, even under optimum development conditions could not likely service a majority of the wheat producers. Under Loan 053, the Extension Service will be better equipped with vehicles and teaching aids which will make it possible to service more producers.

V. PROGRAMMING GOAL

A. Statement of Programming Goal

To reduce dependence on imports of agricultural products and increase exports.

B. Will the achievement of the project purpose make a significant contribution to the programming goal, given the magnitude of the national problem? Cite evidence.

Yes. It is expected that the increased institutional capacity including the upgrading of the local wheat research and soils testing capability, the improved capability of the National Wheat Institute and the increased number of trained technicians in the Ministry of Agriculture will contribute to achieving the program goal by reducing wheat imports. It should be noted, however, that progress in reaching the goal depends heavily on certain actions and policies to be undertaken by the GOB, as enumerated under proposed recommendations.

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**B. QUALITATIVE INDICATORS
FOR MAJOR OUTPUTS**

5. Plans for production of priority products are being developed by the Planning Department of the MACA.

COMMENT: MACA recently completed a five-year agricultural plan, much of which was based on Sector Assessment they previously prepared. With the reorganization of the Planning Office, the addition of new personnel and sending participants for graduate level training, the outlook for continued improvement is favorable.

6. Studies prepared that are pertinent to storage, efficient production of flour and use of by-products.

COMMENT: No additional studies of significance relating to storage, flour production or use of wheat by-products have been completed since the last PAR. Relative to efficient flour production, the average percentage mill out is equal or superior to that realized in the U.S. and could only be measurably improved by milling "whole wheat flour" which would require acceptance on the part of consumers. As to the utilization of by-products, the demand now exceeds the supply. Although not a study, it is relevant to mention that 100 grain storage bins (silos) have been erected in traditional production areas through support provided by the Agriculture Bank.

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B.1. Conditions which will exist when above purpose is achieved	2. Evidence to date of progress toward these conditions.
3. Fifty cooperatives operating and fifty cooperatives in preparation in support of the Wheat Program by 1975.	3. Basically the program was unsuccessful in stimulating the formation of fifty cooperatives for a variety of reasons. The complex regulations governing the formation of cooperatives serves to impede the creation of such organizations. However, as reported in the previous PAR, there have been several groups organized which function similar to coops that participate in wheat production. Also, under the recently approved loan entitled "Small Farmers Organizations", the formation of small farmers cooperatives and federations will receive major attention. A substantial portion of this activity will be in the wheat production areas and should impact upon any wheat production program encouraged.
4. National Organization of a seed certification and regulatory agency including an operational seed lab to determine the demand for improved seed and assuring this need is met.	4. A seed division within MACA is operating with 9 trained personnel and has a seed lab operating in Cochabamba plus four seed cleaning stations at other locations. There is no formal certification program but the organization is providing improved wheat seed to fill the demand. An estimated 34 percent of the wheat currently planted is of an improved variety.
5. Bolivian research capability to meet Bolivian needs in Wheat Production and utilization.	5. Five technicians trained in the U.S. and Mexico are working in wheat research directly or in closely allied areas. A large number of varieties and lines have been tested and trials conducted on fertilizer and cultural methods. However, there remains a need for much more work in production techniques as well as in storage and marketing before the needs are fulfilled.
6. MACA Commercialization Department gathering and disseminating economic information.	6. This department is collecting and publishing every six months a market bulletin of prices for farm products as well as production inputs at all major centers. It also contains estimates of the areas (hectares) planted in major crops. With the development of the sample frame, it is anticipated that the accuracy of the data will improve. This office has been hampered by the lack of technicians and budgetary support but the situation is improving.
7. A viable soil testing program capable of analyzing 10,000 soil samples per year to provide the basis for a fertilizer recommendation system.	7. A modern, well equipped MACA Soils Laboratory is in operation in Santa Cruz serving the whole country. It has the capacity to handle 10,000 soil samples per year. An effective, functioning system exists for receiving and analyzing soil samples and returning results to farmers. Trained lab personnel are operating the lab. Extension agents and soil technicians are trained to teach farmers to prepare and submit soil samples and to interpret results.

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| <p>B.1. Conditions which will exist when above purpose is achieved</p> | <p>2. Evidence to date of progress toward these conditions.</p> |
| <p>d. The credit system is providing acceptable loans for production, marketing and industrialization.</p> | <p>8. USAID Loan 511-L-042 provided funds for 479 wheat loans, amounting to \$28,505,322. These funds are turning over but they are far from adequate to meet the total needs for small producers. Additional funds under Loan 052 and 053, recently available, should contribute greatly to involving more small producers.</p> |
| <p>j. Milling capacity equal to domestic production targets at acceptable qualities, including efficient use of by-products.</p> | <p>9. There has been no change and the statement is included for the reader's convenience. There is adequate milling capacity to meet domestic milling demands. Thirteen modern mills exist in Santa Cruz(1), Tarija (2), Potosí (1), Oruro (2), Cochabamba (3), Sucre (1) and La Paz (3). They have an annual capacity in excess of 135,000 metric tons working 24 hours/day, 270 days/year. There is a strong demand for wheat by-products in the livestock and poultry feed industry and no surplus by-products exist.</p> |

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