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Semi-Annual Report

on

Agency for International Development Negotiated
Contract No. AID/NE-C-1304 (Yemen)

Project No: 279-11-110-030

Contract For: National Sorghum and Millet Crop Improvement

Contents consist of a substantive and administrative report in accordance with General Provisions, paragraph 12, AID 1420-23C (7-1-76)

Period of Report: March 16, 1980 through
September 15, 1980

Previous Reports: January 15, 1977 through September 15, 1977
September 16, 1977 through March 15, 1978
March 16, 1978 through September 15, 1978
September 16, 1978 through March 15, 1979
March 16, 1979 through September 15, 1979
September 16, 1979 through March 15, 1980

Prepared by: University of Arizona
Department of Plant Sciences

Copy to:

Contracting Officer (3)
Mission (4)
AID Reference Center (2)
Yemen Chief of Party (2)
Director, International Agriculture Programs (1)
Department of Plant Sciences (2)

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Substantive Report

Status of work and progress under the contract.

The following bi-weekly reports submitted by Dr. Harnek S. Sandhu, Plant Breeder, portray actual activity in and around the Sana'a area.

Progress and activity reports submitted by Dr. Sandhu and Dr. Deran Markarian, Chief-of-Party, are also provided in this section. Dr. Markarian resided in Hodeiada and worked on the physical development of the Al Jaruba farm.

Contract No. AID/NE - C - 1304 Yemen

Activity Report No. S3, March 16 - 31, 1980

Tractor driver and labor incharge Yahya Abdo is at Jaruba for the last 10 days. I have no tractor driver here at Sana'a. Disc harrow is at Jaruba too. I borrowed the disc and disced field A, B, C and part of D. Floated (smooth) fields A, B with float borrowed from Dr. Fredel. Dragged field A and B before making the ridges for planting. Field C and D will be worked the same way in the 1st week of April.

Repaired Ridges and modified it by attaching marker. I wanted to make the folding type marker but could not get the right material. Opened the furrows in field A and B and marked the ranges, alleys and irrigation channels. Work is in full swing in repairing the old channels and joining the ends of ridges for irrigation.

Repaired pump number two. Replaced the leaking pressure hoses, changed the engine oil and filter. Replaced the broken plastic irrigation pipes.

Spent almost a whole day ie. March 16, 1980 to load a big cement mixer, some heavy iron pipes and some plastic pipes in ministry truck. These pipes will be used at Jaruba farm.

Contacted farmers in Bani Mater valley to arrange land for out reach trial. First farmer contacted asked too much money. Talked to few more and finally one agreed to spare land at reasonable rate.

Visited Mafhag area 100 KM East of Sana'a with MOA representative for another out reach test site. Land is available but is rainfed so the test will be planted when that locality will get good rain.

Contacted British farm manager at Damar. Gave him the letter from MOA which he asked me before he would spare land. Now Mr. Saeed British farm manager is willing to co-operate. Mr. Saeed told me he will get the plot disced for us. They do not have the ridger. I have to go myself with our ridger to prepare ridges at that site.

Inventoried the store (shop) for items used and balance at hand. Laid out the seed of advanced yield trial (80-006) and short grain yield trial (80-005) for final check up of plot numbers, entry numbers and replication number. Rest of the tests will be checked out the same way before taking it to field for planting.

Dr. Markarian went to Jidda on March 16, 1980 and came back on March 19, 1980. He left Sana'a for Hodeidah on March 22, with two-three peace corps guys, Yahya Abdo and three vehciles. Peace corps personnel will help him at Jaruba.

Dr. Markarian was back in Sana'a on March 25, 1980. I did not get a chance to see him as I was leveling field A and he went back the same day.

Land availability at Ibb is not confirmed yet. Dr. Jensen will let me know about it on his next visit to Sana'a. In case he cannot come I will go to Ibb next week.

Mr. Yahya Shuga got promoted and has office in Sana'a. He still helps us on lots of things.

A resident of Sana'a claims that southern half of field D along president's road belongs to him. He asked me to keep out of his land. I asked Yahya Shuga to resolve this problem and he is working on it.

Harnek S. Sandhu

Contract No. AID/NE - C - 1304 Yemen

Activity Report No. S4, April 1 - 15, 1980

Tractor driver and labor supervisor Yahya Abdo is still at Jarubah helping Dr. Markarian. I floated (smoothed) fields C and part of D (rest is claimed by a local resident) with a float borrowed from German Farm. Dragged field C and D and opened the furrows in both fields. Established alleys and marked ranges and irrigation channels in both fields.

First pre-sowing irrigation is complete in fields A, B and C at the end of this reporting period. Dr. Voigt's work suggests two pre-sowing irrigations for uniform germination and emergence. Second pre-sowing irrigation will start on 19th of the instant after finishing field D. I should make it clear that only a part of field D will be planted this year. As I mentioned in my last activity report that a resident of Sana'a is claiming the rest of field D and has started fencing his part. Yahya Shuga was informed about this development and he is negotiating it. I do not know how long it is going to take to solve this problem.

Replaced the broken valve in the irrigation line. Some body drove a vehicle at night and damaged the valve.

Staked the start and end of each replication in ranges for tests numbers 80-001, 80-002, 80-003, 80-005, 80-006, 80-009, 80-012, 80-018, 80-019.

Laid out the seeds of tests number 80-001, 80-002, 80-003, 80-004, 80-007, 80-008, 80-009, 80-012, 80-018, 80-019 and 80-021 for final read-out of plot number, entry number and replication number.

Seeds of tests 80-001, 80-002, 80-003, 80-004, 80-006 and 80-009 were treated with Ceresan Morkit.

Due to unavailability of money to pay land rent, land preparation and planting cost I have to put the out reach tests in low key.

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen
Activity Report No. S5, April 16-30, 1980

4/16 Installed new valve on irrigation line.
Irrigation in field D.
Treated the seed of short grain yield test and F1 populations with Cereson Morkit.
Laid out the seed envelopes of short grain yield trial for final layout of plot number, entry number and replication number.
Shop worker busy in making gates for irrigation system of Jarubah research farm.

4/17 Finished irrigation in field D.
Treated seed of (a) Male parents (b) out reach test with Cereson Morkit.
Joined the edges of ridges and repaired irrigation channels in field A staked tests (a) Early maturity (b) F1 population (c) Male parent (d) out reach tests at Bir Al-Ghoum farm
Shop: day off.

4/18 Friday

4/19 Irrigation in field A
Treated seed of (a) National coop observation test (b) Pearl millet yield nursery iwth Cereson Morkit.
Laid out the seed of (a) Advanced yield trial (b) Pearl millet yield nursery for final read out of plot number, entry number etc.
Staked tests (a) Pearl millet yield nursery (b) PMDM test (c) Introduction.
Shop: Gates for irrigation system of Jarubah Research Farm.

4/20 Irrigation in field A
Joined the ends of ridges in field A.
Treated seed of (a) IPMAT nursery (b) IPMAT nursery 78 seeds with Cereson Morkit.
Laid out the seed for four locations of out reach test and checked the plot number, entry number and replication number
Shop: Started working on old blazer.

4/21 Irrigation in field A
Planted a part of Elite test in field A (69 rows)
Treated seed of (a) International pearl millet DM nursery test (b) Introduction seed with Cereson Morkit.
Shop: Engine rebuilding of white blazer.

4/22 Irrigation in field A and B
Planting (a) Elite Yield Test R 2
(b) Advanced Yield Trial
Repaired damaged irrigation pipe.
Brought back ridger (Furrow opener) from British Farm

4/23 Irrigation in field B
Sent seed to Mahaweit for out reach test
Planting (a) Advanced yield trial
(b) Preliminary yield trial II
Shop: white blazer engine

4/24 Dr. Upchurch arrived in Sana'a.
Dr. Markarian in Sana'a.
Irrigation in field B
Planting (a) Advanced yield trial
(b) Preliminary yield trial II
Shop: Thursday off

4/25 Friday

4/26 Irrigation in field A
Planting (a) Preliminary yield trial II
(b) Short grain yield trial
Shop: changed the engine oil on pump No. 1, worked on 0024 vehicle (Horticulture)

4/27 Irrigation in field A
Planting (a) Preliminary yield trial II
(b) Short grain yield trial
Shop: 0024 red pickup (Horticulture)
putting together old white blazer

4/28 Dr. Upchurch departed for States
Irrigation in field B
Planting: preliminary yield trial II Rs.
Dr. Markarian back in Sana'a
Shop: changed engine oil 024 suburban 030 suburban
Engine rebuilding of white blazer 100

4/29 Irrigation in field B
Planting: Preliminary yield trial II R2
short grain yield trial R3
Shop: white blazer engine work

4/30 Irrigation in field B
Planting preliminary yield trial I rep. 1
Finished short grain yield test Rep 3.
Dr. Markarian went back to Jarubah.

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen
Activity Report No. S6, May 1-16, 1980

5/1 Local Holiday

5/2 Friday

5/3 Irrigation in field A
Planting: (a) Head rows
(b) Preliminary yield trial I Rep I
(c) Border rows
(d) Out reach test at Alrasa about 70 km. west of Sana'a.
Shop: still busy in assembling white blazer

5/4 Irrigation in field A
Planting: (a) Head rows
(b) Preliminary yield trial I Rep I
Visited Bany-Maymoon for out reach test farmer was out of town
Shop: (a) white blazer
(b) front end loader tractor tire fixed

5/5 Irrigation in field B
Planting: (a) Head rows
(b) Preliminary yield trial I Rep II
Visited Bany-Maymoon and arranged land for out reach
Shop: (a) Bather's pickup radiator
(b) white blazer ready for test

5/6 Irrigation in B
Planting: (a) Preliminary yield trial I Rep II
(b) Increases
Dr. Markarian back in Sana'a
Shop: horticulture red pickup engine work

5/7 Irrigation in field C
Planting: (a) Maize observation test Rep I
(b) Head rows
Dr. Markarian went back to Jarubah
Shop: started working on rebuilding a discarded pickup

5/8 Irrigation in field C
Planting: (a) Head rows
(b) Pearl millet adaptation trial
(c) Maize observation test Rep II
(d) Out reach test at farmer's field Bany-Maymoon
Shop: Day off

5/9 Friday

5/10 Planting: (a) Pearl millet adaptation trial 78
(b) Pearl millet adaptation trial 79
(c) Maize observation test Rep III
Sprayed advanced yield trial and elite yield trial for shoot borer
Shop: rebuilding old green pickup

5/11 Hand weeding field A (2 ranges)
Sprayed against shoot borer in field A
Planting: (a) Head rows
(b) Increases
Shop: (a) gates for Jarubah irrigation system
(b) rebuilding old green pickup

5/12 Herbicide spray in field C
Insecticide spray for shoot borers in field B and at Al-Rasah out reach test
Hand weeding in field A
Emergence note at Al-Rasah out reach test
Shop: (a) repaired the front end loader tractor
(b) rebuilding old green pickup

5/13 Planting: (a) Out reach test at Bir Al-Gohum
(b) Crossing block male sterile lines
(c) Early maturity trial
Shop: service Dr. Issa's vehicle (Horticulture Project)
welded gates for Jarubah Research Farm
engine work on white blazer
replaced a defective bearing in Bather's pickup, had to take the engine down

5/14 Irrigation in field C
Planting: (a) F1 populations
(b) Regional co-op. PMY nursery
(c) Visited Jahana for out reach test. Rented tractor and prepared the land for out reach test.
Shop: radiator repair of green pickup
white blazer engine down to replace bearing in gear box

5/15 Irrigation in field A in the morning and then new pump broke
Needs new foundation blocks
Planting: (a) F1 populations
(b) Male sterile lines
(c) Hand weeding in field C
Sprayed field A for shoot fly
Shop: Thursday - off week end

5/16 Friday week end

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen

Activity Report No. S7, May 17-31, 1980

5/17/80 **Irrigation:** No irrigation, engine foundation needed repair
Planting: (a) Pearl millet downly mildew nursery
(b) Male parents

Meeting with Sorghum/Millet design team. Discussed the acerage, yield and future developments.
Shop: Repaired the foundation of engine on Bir Al-Gohum research farm.

5/18/80 Planting: Out reach test in Damar Area
Planted four increases at British Farm (Due to shortage of space at Sana) laid out Jahana out reach test.
Shop: Red Pick up (Horticulture) engine work.

5/19/80 Meeting with Deputy Minister of Agri. Seed production in Yemen Arab Rep. was discussed in detail and a tentative plan to multiply seed of new releases was approved. A wheat variety sonalika introduced from India was released for nation wide cultivation. Another wheat variety Dhumran was held for one more year due to lack of supporting data. Barley variety arivat LL LL8 was released but its name was changed to Arafat. Maize variety Tihama I was released and Tihama 2 was held for more observations.
Sprayed tests (a) Preliminary yield trial (b) short grain yield trial and (c) Advanced yield trial.
Dr. Markarian in Sana.
Hand weeding in field A
Shop: Worked on old title 12 buick.

5/20/80 Meeting with Director General of Research. Most of the time was spent on seed certification, seed storage and seed distribution.
Hand weeding in field C.
Spray in field A.
Shop: worked on white suburban (Jarubah farm)

5/21/80 Irrigation in field A
Laid out the out reach test at Amran. Opened the furrows and irrigated (Pre sowing irrigation).
Hand weeding in field A
Spray in field D.
Shop: Worked on the green pick up radiator.

5/22/80 Irrigation in field A,B
Hand weeding yield A,B
Meeting with poultry project design team
Shop: Thursday off

5/23/80 Friday

5/24/80 Irrigation in field A
Hand weeding in field B
Meeting with Sorghum/millet Project Design team.
Shop: (a) Title 12 buick.
(b) White suburban (Jarubah Farm)

5/25/80 Meeting with Ministry of Agriculture.
Meeting with Dr. Meyer Sorghum/Millet Project Design team
Gap filling in field A test preliminary yield trial II.
Irrigation in field A.
Shop: (a) Title 12 buick
(b) Gates for irrigation system of Jarubah

5/26/80 Memorial day
Planted out reach test at Amran
Irrigation in field B and D.
Shop: Day off
Hand weeding in field A.
Irrigated out reach test at Damar because it was planted in dry land.

5/27/80 Presowing irrigation at Jahana for out reach test
Irrigation in field B
Gap filling preliminary yeild trial I
Shop: Title 12 buick

5/28/80 Irrigation in field B
Hand weeding in field C
Hill count in field A for gap filling.
Shop: Lab school suburban
Title 12 buick

5/29/80 Irrigation in field D.
Hand weeding in A.
Spray in field A
Shop: Thursday off

5/30/80 Friday

5/31/80 Planted out reach test at Jahana
Gap filling in field B
Irrigation in field A.
Discussed Jarubah farm development with Dr. Markarian
Discussed staff requirement with Sorghum/Millet Design team.
Shop: Dr. Markarian's pick up
White blazer broke down in town.

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen

Activity Report No. S8, June 1-15, 1980

6/1/80 Planting: Test 80-023 (International Pearl Millet Adaptation Trial).

Irrigation in field A

Hand weeding in field A and C.

Shop: Horticulture (024) red pick, Ibb school suburban repair

6/2/80 Planting: Finished planting test 80-023 (IPMAT)

Gap filling in field B

Irrigation in field A

Attended meeting at central Research Centre in Taize discussed the future developments in Sorgum, Pearl Millet and Maize research.

Shop: Engine oil changed of pump No. 1 at Bir-Al-Gohum research horticulture (024) red pick up transmission down.

6/3/80 Gap filling in field A

Irrigation in field A

Hand weeding in field B.

Shop: Horticulture (024) red pick up transmission work

6/4/80 Gap filling in field A.

Irrigation in field A.

Hand weeding in field B.

Shop: Front breaks green Suburban.

Repaired Title 12 Buick

6/5/80 Gap filling in field A

Irrigation in field B

Hand weeding in field B

Shop: Thursday Off

6/7/80 Gap filling in field A

Thinning tests 80-003, 80-005

Irrigation in field B.

Shop: Title 12 buick and horticulture (024) white suburban

6/8/80 Gap filling in field B
Thinning tests 80-006, 80-009
Irrigation in field B.
Germination notes on out reach test Al-Rasah.
Shop:- Gates for irrigation system of Gerubah farm
White blazer and Title 12 old buick

6/9/80 Thinning and weeding in field A test 80-001 Rep I
Pre-planting irrigation in field D.
Spray against stem borer test 80-005
Shop: Gates for irrigation system of Jarubah
Horticulture (024) red suburban

6/10/80 Irrigation in field D
Thinning at weeding in field A test 80-001 Rep II
Spray against stem borer test 80-003 Rep I and Rep II and test 80-005 Rep I and Rep II, 80-001, Rep I.
Procured seed shipped from ICRISAT
Shop: Gates for irrigation system of Jarubah

6/11/80 Planting: 80-013 (International Sorghum Preliminary yeld Trial I).
Seed of this test was received from ICRISAT on 6/10/80.
Spray in field B test 80-002 Rep I., 80-005, 80-006.
Irrigation in field A.
Visited British Farm Damar and Dutch Research Centre at Radha.
Shop: Cutting pipes for Horticulture (024) shade house

6/12/80 Irrigation in field C.
Planting: 80-014 International Sorghum Preliminary Yield Trial II.
Visited Central Research Institute and have talk with Sorghum, Vegetable, and Horticulture expert of that centre. Also visited British Mechanization Centre in Taize.
Shop: Thursday-off

6/15/80 Irrigation in field C.
Hand weeding and thinning tests 80-010, 80-004.
Spray against stem borer tests 80-002 Rep 2
Shop: Horticulture (024) red suburban door.

Harnek S. Sandhu

June 21, 1980

Dr. Harnek S. Sandhu, (030 Sorghum/Millet Project)

Loss of Advance research material

Director (USAID)

Apparently a new road is under construction and is passing through the North-West corner of Bir-Al-Gohum Research Farm. On 6/18/1980 road construction crew drove tractor into farm, ripping fence at two different places and destroyed valuable research material of the following tests:

Tests	Replication	No. of Rows
80-018 International Pearl Millet Adaptation Nursery (I)	2	42
" " " " " " (I)	3	42
" " " " " " (I)	1	14
80-019 International Pearl Millet Adaptation Trial	3	42
80-011 Seed Increases of 8 Advance entries 7 rows each	-	49

Loss of this genetic material specially of advance entries will have an adverse effect on the early achivements of this project.

cc. Tracy Atwood

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen
Activity Report No S9, June 16-30

6/16/80 Irrigation in field A
Hand weeding and thinning in field C
Spray against stem borer test 80-002, 80-012, 80-020.
Shop: Repaired Horticulture (024) red suburban

6/17/80 Irrigation in field A
Hand weeding and thinning in field C
Spray against stem borer test 80-010, 80-004
Shop: loaded heavy pipes in truck for Jarubah

6/18/1980 Irrigation in field A, Test 80-001, 80-003
Hand weeding in field A
Thinning in field B 80-002 Rep. 2
Cleaned the seed house, cloth logs for next harvesting
Germination notes on out reach test at Amran site
Shop: Horticulture (024) Red sub. engine work
Horticulture (024) Red sub. break work
cutting support pipes for horticulture shade house

6/19/1980 Irrigation in field A, test 80-003, 80-006, 80-005
Foliar application of urea, tests 80-003, 80-006, 80-005
Hand weeding in field C
shop: Thursday off

6/21/1980 Irrigation field A, tests 80-005, 80-006, 80-009
Foliah application of nitrogen 80-005, 80-006, 80-009
Instalation of new fence as the road constructionorew ripped fence.
Hand weeding in field C
Shop:- Horticulture 024 white suburban
Irrigation gates for Jarubah.

6/22/1980 Irrigation in field A, tests 80-003,
Foliar application of nitrogen 80-003
Hand weeding in field A
Instalation of new fence along the new road
Shop: Irrigation gates for Jarubah
Repaired pump No. 1

6/23/1980 Irrigation in field B test 80-010
Top dressing in field B
Foliar application of Nitrogen in field B
Hand weeding in field A tests 80-001 and 80-019
Worked on fence along the new road.
Shop: Irrigation gates for Jarubah farm.
Rebuilding old green pick up engine.

6/24/1980 . Irrigation in field B tests 80-002, 80-009, 80-005, 80-023, 303 plots
Top dressing in field B tests 80-002, 80-009, 80-005.
Foliar application of nitrogen 80-002, 80-009, 80-005.
Hand weeding in field A
Finished instalation of new fence.
Shop: Gates for Jarubah irrigation system
Red pick up Hort. 024 Project.

6/25/1980 Irrigation in field B, tests 80-002, 80-005
Top dressing field B, test 80-002
Foliar application of nitrogen 80-002, 80-004, 80-007, 80-008, 80-010, 80-012.
Hand weeding in field C.
Thinning out reach test (80-010) at Jahana
Shop: Ibb school suburban, engine work
Rebuilding old green pick up engine.

6/26/1980 Irrigation in field B, test 80-002, 80-012

Top dressing in field B, test 80-012, R1, R2, R3.

Foliar application of nitrogen 80-007, 80-021.

Hand weeding in field A and C

Germination observations of the out reach test (80-010) at Mafhag.

Shop: Thursday off.

6/28/1980 Irrigation in field B and C tests 80-012, 80-010, 80-020.

Top dressing in field B1, C,D tests 80-010, 80-013, 80-020.

Foliar application of nitrogen, 80-017, 80-021.

Hand weeding in field A.

Shop: Rebuilding old green pick up engine

Hort 024 red suburban

6/29/1980 Irrigation in field D, tests 80-013, 80-014, 80-025

Top dressing field D, test 80-014

Hand weeding in field A and C.

Entered test 80-013, 80-014 in field boods

Shop: Cut pipes and welding work for Ministry of Agriculture

Rebuilding old green pick up.

6/30/1980 I rrigation in field C, tests 80-004, 80-008, 80-021

Top dressing in field C, tests 80-04, 80-008, 80-021.

Hand weeding in field A and C

Cleaned the seed house

Entered test 80-021 in field boodk

Shop: Title 12 buick broke down in town

Horticulture red pick up rear axle replaced

Welding work for Ministry of Agriculture

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen

Activity Report No. S10, July 1-15, 1980.

7/1/1980 Irrigation and top dressing in field C test 80-008 male parents test 80-007, F1 populations

Hand weeding in field B

Fence repair along the new road

Shop: Fixed the Horticulture (024) red pick up.

Senior welder welded Ministry of Agri. pipes at Mafhag Government farm.

7/2/1980 Mr. Arfa and Mr. Lubber arrived at Sana. Registration and drivers licence papers were processed for them.

Irrigation and top dressing in field C test 80-017 (Pearl Millet Yield Nursery rep. 1, 2, 3)

Irrigation and top dressing in field C test 80-021 (Sorghum Introductions rep. 1 and rep 2)

Hand weeding in field B.

Fence repair along the new road.

Shop: Worked on Horticulture (024) red pick up.

Fixed title 12 Buick.

Senior welder helped Ministry of Agri. at Mafhag farm.

7/3/1980 Irrigation and top dressing in field A, test 80-019 (International Pearl Millet Adaptation Trial) Rep. 2

Hand weeding in field B,

Foliar application of Nitrogen in tests 80-007 (F1 population) 80-008 male parents and 80-010 (out reach test).

Shop: Thursday off

Senior welder helped MOA.

7/5/80 Friday July 4, 1980 Mr. Yunes arrived. His residence and driver's linence papers were processed.

Irrigation and top dressing in field A, tests 80-001 (Head rows).

80-003 (Preliminary Yield Trial).
80-019 (Int. Pearl Millet Adaptation Tial).

Hand weeding in field A

Shop: Rebuilding engine of old green pick up.

Welder worked for MOA at Mafhag farm

7/6/1980 Irrigation and top dressing in field A tests 80-001 (head rows)
80-003 (Preliminary Yield Trial)

Foliar application of Nitrogen in tests 80-006 (Advanced Yield Trial)
80-009 (Elite yield Trial)

Hand weeding in field B

Shop: Rebuilding engine of old green pick up

Welder worked for MOA at Mafhag farm

7/7/1980 Irrigation and top dressing in field A test 80-003
(Preliminary yield Trial II)

Foliar application of urea Tests 80-003(" " " ")

80-005 (Short Grain Yield Trial)

80-012 (Maize Observation Test)

80-002 (Prelim. Yield Trial I)

Shop: Rebuilding engine of green pick up.

Welder still with MOA at Mafhag farm

Took Mr. Lubber and Mr. Yunus to Jarubah

Attended meeting with EXO AID

7/8/1980 At Jarubah surveyed and stoked a field for leveling.

Worked on the village pump which have broken shaft.

Irrigation and top dressing tests 80-003 (Preliminary Yield Trial II)

Foliar application of urea: Tests 80-002 (" " " I)

80-005 (Short Grain Yield Trial)

80-006 (Advanced Yield Trial)

80-009 (Elite Yield Test)

80-007 (F1 Populations)

Shop: Horticulture (024) red pick up.

Senior welder with MOA at Mafhag farm

7/9/1980 Irrigation and top dressing test 80-005 (Short Grain Yield Trial)

80-006 (Advanced Yield Trial)

Foliar application of urea tests 80-007 F1 populations

80-021 (Sorghum Introductions)

80-017 (Pearl Millet Yield Nursery)

Hand weeding in field A

Shop: Horticulture (024) red pick up.

Rebuilding engine green pick up.

Senior welder with MOA at Mafhag farm.

7/10/1980 Irrigation and top dressing tests 80-005 Rep II (Short Grain Yield Trial)

Hand weeding in field B.

Thinning in field B

Heading notes in field A and B,

Shop: Thursday - off.

7/12/1980 Irrigation and top dressing 80-003 (Preliminary Yield Trial I)
80-005 (Short grain Yield Test)
80-009 (Elite Yield Test)

Hand weeding in field B.

Heading notes in field A and B.

Shop: Rebuilding engine of green pick up truck

Senior welder still with MOA at Mafhag farm.

7/13/1980 Irrigation and top dressing test 80-011 (Seed Multiplication)

Hand weeding in field B.

Thinning in field B

Heading notes in field A,B and C.

At the request of Ministry of Agriculture visited Taiz area to advise a party on the development of a large scale farm. The mentioned party is interested in the production of Sorghum, Millet and Corn.

The month-long Moslem holiday (Ramadan) started to-day. During this time local employees will work only six hours a day.

Shop: Put the rebuilt engine in green pick up.

Senior welder still with MOA at Mafhag farm.

7/14/1980 Irrigation and top dressing tests: 80-002 (Preliminary Yield Trial I)
80-005 (Short Grain Yield Trial)
80-009 (Elite Yield test)

Hand weeding in field B

Thinning in field B

Heading notes in fields A,B and C

Attended meeting with EXO, AID

Shop: Horticulture (024) red suburban engine down

Senior welder with MOA at Mafhag farm

7/15/1980 Irrigation and top dressing tests 80-002 (Preliminary Yield T. I)
80-005 (Short Grain Yield Trial)

Hand weeding in field C

Thinning in field B.

Heading notes in fields A, B and C

Shop: Horticulture (024) red suburban

Senior welder still with MOA at Mafhag farm.

Sana'a did not have rain since last April. Water discharge from tube well No. 1 and 2 has gone down to two liters and ½ litters per second respectively. Generally July is considered rainy month but not this year.

Harnek S. Sandhu

cc. Dr. Voigt
Dr. Markarian .

Contract No AID/NE-C-1304 Yemen

Activity Report No S 11, July 16-31, 1980

7/16/80 Irrigation in field B test, 80-002 (Preliminary yield Trial I)
Thinning in field A
Hand weeding in field B
Heading notes fields A, B and C.
Shop: Pump repair at Bir-Al-Gohum research farm.
Horticulture (024) red suburban engine work.

7/17/80 Irrigation in field B test 80-002 Preliminary Yield Trial
Hand weeding in field B
Thinning in field A
Heading notes fields A, B and C.
Shop: Thursday - off

7/19/80 Irrigation in field D tests
Hand weeding in field B
Thinning in field A
Heading notes in fields A,B and C.
Mr. Yunus and Mr. Bather visited out reach test at Jahanaa
Shop: Horticulture (024) red suburban

7/20/80 Irrigation in field D tests:
Hand weeding in field A
Thinning in field A
Heading notes in fields A,B and C.
Mr. Yunus and Bather visited out reach test at Damar.
Shop: Repaired pump and changed engine oil of pump No 1 at Bir-Al-Gohum.
Horticulture (024) red suburban.

7/21/80 No irrigation, pump engine broke down. Brought that engine in shop. After taking it appart found it needs, new rings, new fuel pump plungers, new fuel injectors.
Hand weeding in field C.
Heading notes in fields A,B and C
Percent stand count in test 80-006 Advanced Yield Trial
Shop: Horticulture (024) red suburban engine down.

7/22/80 No irrigation, no rain, engine over hauling in progress
Hand weeding in field A.
Thinning in field C.
Heading notes in fields A,B and C.
Mr. Hamdi and Mr. Bather visited out reach test at Amran
Bought the replacement parts for engine stores and shops open only at night.
Shop: Horticulture (024) green suburban.

7/23/80 Hand weeding in field A
Thinning in field C.
Heading notes in field A, B and C.
Selfing one to two heads in selected lines in field A,B,C.
Shop: Over hauling Bir-Al-Gohum pump engine.
Horticulture green suburban took the old engine out

7/24/80 Heading notes in field A,B and C.
Hand weeding in field A.
Thinning in field C
Irrigation in field B.
Selfing in field A,B,C.
Shop: Rebuilding pump engine.

7/26/80 Percent stand count in test 80-009, (Elite yield test)
Hand weeding in field C
Heading notes in fields A,B,C.
Bird watching in fields A,B, and C.
Irrigation in field B
Shop: Pump engine over hauling
Replaced gasket of green blazer.

7/27/80 Mr. Younes and Mr. Bather visited Jahana out reach test and sprayed against aphids. Also applied foliar application of urea.
Hand weeding in field A.
Heading notes in fields A,B,C
Selfing one to two selected heads in test 80-001 (head rows).
Bird watching in fields A,B and C
Percent stand count in tests 80-005 (short grain yield trial).
80-006 (Advanced yield trial).
Shop: Instalation of rebuilt pump engine.
CID brown suburban clutch work.

7/28/80 Irrigation channel repair
Hand weeding in field C and D.
Bird watching in fields A,B and C
Selfing heads in test 80-010 (head rows)
Percent stand count in test 80-010 out reach test.
Fence repair along the west side of farm
Shop: Pump engine repaire (fuel pump).
Changed engine of Horticulture 024 red suburban to green suburban.

7/29/80 Hand weeding in field C and D.
Prepared field for Mr. Younes soybean planting
Fence repair along the East end of farm.
Bird watching in field A,B and C.
Along with Mr. Younes visited out reach test at Bany-Naymoon. No rain for the last 3½ months. Plants are only 6-9 inches tall and are already heading.
Irrigation in field B using old pump.
Shop: Still working on changing engine of Horticulture (024) red suburban to green suburban.

7/30/80 Mr. Younes visited out reach test in Emran.
Hand weeding in field D and B.
Bird watching in fields A,B,C.
Heading notes in fields A,B,C.
Percent stand count in tests 80-004 Early maturity trial
Irrigation in field B
Shop: Pump repaire at Bir-Al-Gohum.
Green Blazer radiator work
engine oil changed of green blazer

7/31/80 Hand weeding in field B test 80-018 Int. Pearl Millet Tial
Irrigation field B using old pump only.
Bird watching in fields A,B,C.
Percent stand count in 80-012 Maize observation
Shop: Thursday-off.

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen

Activity Report No. S12, August 1-15, 1980

8/2/80 Heading notes in field B test 80-012 (Maize observation test)
80-018 (Inter Nat. Pearl Millet Adap. Trial)
80-019 (" " " " " ")
Selfing in field A test 80-006 (Advanced Yield Trial)
80-009 (Elite Yield Trial)
Irrigation in field A
Bird watching in field A,B and C.
Hand weeding in field B.

8/3/80 Selfing in field A tests 80-005 (Short grain yield Trial)
80-002 (Preliminary yield Trial I)
Heading notes tests 80-006 (Advanced Yield Trial)
80-005 (Short Grain Yield Trial)
80-009 (Elite Yield Trial)
Hand weeding in field B.
No irrigation pump out of order
Bird watching in fields A,B and C.

8/4/80 Selfing in field B test 80-006 (Advanced yield Trial Rep III)
80-009 (Elite Yield Trial Rep III)
80-002 (Preliminary Yield Trial I Rep II)
80-003 (Preliminary Yield Trial II Rep I)
Heading notes tests 80-021 (Sorghum Introductions)
80-018 (Inter Nat. Pearl Millet Adap. Trial)
80-019 (" " " " " ")
Hand weeding in field B
Bird watching in field A,B,C
No irrigation pump out of order

8/5/80 Irrigation in field B
Selfing in tests 80-004, 80-005, 80-001, 80-007, 80-008, 80-021
Heading notes test 80-002, 80-003, 80-006, 80-009, 80-010
Hand weeding in field C
Bird watching field A,B and C.

8/6/80 Irrigation in field A, test 80-003, 80-006, 80-009
Selfing in tests 80-002, 80-003, 80-006, 80-009, 80-010
Heading notes test 80-001, 80-004, 80-005, 80-007, 80-008, 80-021
Hand weeding in field B
Bird watching field A,B,C.

8/7/80 Irrigation in field A
Bird watching fields A,B and C

8/8/80 Friday off

8/9/80 Irrigation in field A
Bird watching in field A,B and C
Visited out reach test at Damar. Test need weeding.
Heading notes tests 80-002, 80-003, 80-006, 80-009
Selfing in tests 80-001, 80-004, 80-005, 80-007, 80-008 and 80-021

8/10/80 Irrigation in field A
Bird watching in field A,B and C
Heading notes tests 80-001, 80-004, 80-005, 80-007, 80-008 and 80-021
Selfing in tests 80-002, 80-003, 80-006, 80-009

8/11/80 Eid Holidays started to day. All offices closed for 3 days
Bird watching in field A,B and C
Irrigation in field A

8/12/80 Eid Holiday. All techinician off
Bird watching in field A,B and C
Irrigation in field A

8/13/80 Eid Holiday
Bird watching in fields A,B and C
Irrigation in field B
Heading notes tests 80-001, 80-004, 80-005, 80-007, 80-008 and 80-021

8/14/80 Eid Holiday
Bird watching in fields A,B and C
No irrigation. Fuel pump of motor needs new plungers No store open due to Eid and have to wait till 8/16/80 when the stores will re-open.
Heading notes tests 80-002, 80-003, 80-006, 80-009, 80-010.

8/15/80 Friday off
Mr Hubber came to Sana on 8/6/80 to buy some parts and will go back some time after 8/16/80.

Harnek S. Sandhu

Contract No AID/NE-C-1304 Yemen

Activity Report No. S13, August 16-31, 1980

8/16/80 Bird watching: There is no other sorghum field around research farm (Bir Al-Gohum)
Birds are causing heavy damage. Four farm worker, two in the morning and two in the evening watch the birds.
Heading notes tests 80-002, 80-003, 80-006, 80-009 and 80-010.
Selfing: two heads in selected rows in tests 80-001, 80-004, 80-005, 80-007, 80-008.
No irrigation. Pump motor being repaired.

8/17/80 Bird watching in fields A,B and C
Heading notes in tests 80-001, 80-004, 80-005, 80-007, 80-008.
Selfed two heads in selected rows in tests 80-002, 80-003, 80-006, 80-009 and 80-010.
Visited out reach test at Damar and Rhadha.
No irrigation. Pump motor still being repaired.
Mr. Lubber went back to Hodeidah after Eid Holidays.

8/18/80 Bird watching in fields A,B and C.
Heading notes in tests 80-002, 80-003, 80-006, 80-009 and 80-010
Selfed two heads in selected rows in tests 80-003, 80-006, 80-008, 80-009.
No irrigation. Pump motor still being repaired
On the basis of phenotypic characters selected rows in tests 80-001, 80-003, 80-024.
Planted Mr. Younus Soybean trial at Bir Al-Gohum research farm.

8/19/1980 Bird watching in fields A,B and C.
Irrigation tests 80-012, 80-021, 80-023 and part of 80-010
Planted Mr. Younus Soybean trial.
Thinning in field D tests 80-013, 80-014.
Selfing in tests 80-008, 80-003
Selections on the basis of phenotypic characters in tests 80-002 Rep I

8/20/80 Bird watching in fields A,B and C
Irrigation in field C tests 80-010, 80-004, 80-008
Thinning in field D test 80-014 (late planting)
Hand weding in field B.
Selections on the basis of phenotypic characteristics tests 80-009, 80-008, 80-021.
Selfing in tests 80-008, 80-002 and 80-001.
Mr. Younus went to Hodeidah.

8/21/80 Week end (Thursday)
Irrigation in field C tests 80-017, 80-021 and 80-007, 80-003, 80-005.
Bird watching in field A, B and C.
Hand weeding in field B
Selfing in tests 80-003, 80-004.

8/22/80 Week end (Friday)
Irrigation in field D, soybean test and sorghum tests 80-013, 80-014.
Bird watching in fields A, B and C.

8/23/80 Irrigation in field A tests 80-003, 80-006, 80-009, 80-005
Bird watching fields A, B and C
Hand weeding in field B test 80-010
Selfing in field A tests 80-005, 80-006, 80-009

8/24/80 Irrigation part of test 80-003, 80-006, 80-009.
Selfing two heads in selected rows in tests 80-003 and 80-009.
Bird watching fields A, B and C.
Hand weeding in field B test 80-010.

8/25/80 Irrigation part of test 80-003 rep II
Blooming notes 80-008 rep I, 80-004 rep I-III, 80-007 rep I 80-003 rep
Selfing in test 80-002 and 80-006.
Bird watching in field A, B and C.
Bagging male sterile plants for crossing in test 80-007.
Hand weeding in field C test 80-004.

8/26/80 No irrigation pump dynamo needs to be replaced.
Bird watching in fields A, B and C.
Hand weeding in field C test 80-007.
Selfing in test 80-002 rep I and rep II.
Blooming notes in tests 80-002, 80-006, 80-009.

8/27/80 Irrigation tests 80-012, 80-013 and Mr Younus soybean test.
Blooming notes in tests 80-004, 80-005, 80-007
Bagging male sterile plants for crossing in test 80-007
Hand weeding in field B part test 80-005
Bird watching in fields A, B and C.

8/28/1980 Thursday week end
Irrigation in field A tests 80-001, 80-018
Bird watching in fields A, B and C.
Hand weeding in field B.
Selfing in field A test 80-005

8/29/80 Friday week end
Irrigation in field A test 80-019 and field B 80-011
Bird watching in field A, B and C.

8/30/80 Irrigation in field B test 80-006 rep. III, 80-009 rep III, 80-005 rep III
Bird watching in fields A, B and C.
Hand weeding in field part of tests 80-007, 80-005
Selfing tests 80-005, 80-001, 80-007, 80-017
Blooming notes in tests 80-005, 80-001, 80-007, 80-017

8/31/80 Irrigation in field B test 80-002 rep I and rep II
Bird watching in fields A, B and C.
Hand weeding in field B part of test 80-002.
Selfing tests 80-003 rep II and 80-001.
Blooming notes tests 80-001 and 80-003
Bagging male sterile plants for crossing.

Harnek S. Sandhu

Contract No. AID/NE-C-1304 Yemen

Activity Report No. S14, Sept. 1-15, 1981

9/1/80 Irrigation test 80-002 rep I and II
Selfing in tests 80-002 and 80-005
Bird watching fields A,B and C.
Hand weeding in field C.
Bagging male sterils for crossing

9/2/80 Irrigation tests 80-002 rep. II, 80-012 rep. I,II andIII 80-020 rep I and II.
Selfing in tests 80-006 and 80-009
Hand weeding in field C
Bagging male sterile plants for crossing.
Blooming notes in tests 80-013, 80-014.
Bird watching in fields A,B and C.

9/3/80 Irrigation field C tests 80-010, 80-004, 80-008, 80-017
Hand weeding field A part of test 80-005
Bird watching fields A,B and C
Attended meeting in Ministry of Agri. Discussed the annual report.
Blooming notes in field A test 80-018 and 80-019.
Bagged male sterile for crossing.

9/4/80 Thursday week-end
Irrigation in field C tests 80-004, 80-007, 80-008.
Hand weeding a part of test 80-005.
Blooming notes tests 80-001 and 80-002.
Bird watching in fields A,B and C
Bagging male sterile for crossing.
Pollination of bagged male sterile plants.

9/5/80 Friday week-end. Bird watching on fields A, B and C.

9/6/80 Crossing male sterile plants with local selections
Bagging male sterile for crossing.
Irrigation part of tests 80-007, 80-008, 80-017, 80-021, 80-025
Hand weeding part of tests 80-005, 80-009.
Bird watching in fields A,B and C.

9/7/80 Crossing male sterile plants with local selections
Bagging male sterile for future crossing
Irrigation part of tests 80-025, 80-005, 80-003
Hand weeding part of tests 80-005, 80-009.
Stand count in tests 80-002, 80-005, 80-017
Blooming notes in tests 80-007, 80-008.
Birdwatching in fields A, B and C.
Heading notes and weeding out reach test at Damar.

9/8/80 Crossing male sterile plants with local selections
Bagging male steril plants for crossing
Irrigation part of tests 80-003, 80-005, 80-006 and 80-009.
Hand weeding part of tests 80-005 and 80-009.
Bird watching in fields A, B and C.

9/9/80 Mr. Younus visited out reach tests at Mafhag.
Selfing in test 80-001
Crossing male sterile plants with local selections.
Bagging male sterile plants for crossing
Irrigation part of tests 80-005, 80-006, 80-009
Hand weeding only one labor in tests 80-009.
Bird watching in fields A,B and C.

9/10/80	Crossing male sterile with selections Bagging male sterile for crossing. Irrigation part of tests 80-003 and 80-005 Hand weeding part of test 80-009 Selfing tests 80-002 Blooming notes in tests 80-002, 80-004, 80-008. Bird watching fields A,B and C. Mr. Younes left for Hodeidah.
9/11/80	Thursday week-end Irrigation part of test 80-002, 80-005, 80-009. Hand weeding field C part of test 80-007 Bird watching fields A, B and C
9/12/80	Friday week-end Bird watching fields A, B and C
9/13/80	Irrigation part of test 80-001 and 80-003 Blooming notes in tests 80-001, 80-002 R1, 80-003 R1 and R2 Percent stand count of test 80-003 R1 Bagging male sterile for crossing Crossing male sterile with selected palants. Bird watching in fields A,B and C. Hand weeding in field C.
9/14/80	Bagging male sterile for crossing Crossing male sterile with selected entries Irrigation part of tests 80-001, 80-019, 80-018 rep 1, 2 and 3. Hand weeding in tests 80-005 R2 and 80-009 R2. Lab. work: Calculation of percent stand. Bird watching in fields A, B and C.
9/15/80	Blooming notes tests 80-001 R1, 80-002 R1 Lab. making tags ready for harvesting put rat poison in the seed house Crossing male sterile with selected lines Bagging male sterile for crossing. Hand weeding a part of tests 80-005, 80-006. Irrigation part of test 80-006. Mr. Lubber and Younes came to Sana.

Harnek S. Sandhu

Project: National Sorghum/Pearl Millet Improvement Program for Yemen Arab Republic

Location: Bir Al-Gohum Research Farm Sana

Period: Feb 1980 to July 1980

Subject: Progress and activity report Project 030

From: Dr. Harnek S. Sandhu

To: Mr. C. Bell Deputy Director USAID

AUG 1980
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DEPARTMENT

Please find enclosed the progress and activity report of Project 030 (Sorghum/Pearl Millet) covering the time Feb 1980 to July 1980.

cc. ✓Dr. Upchurch *Copies of activity report are already with your office.
Dr. Markarian
Mr. Shuga
Dr. Noman

27 AUG 80

R. VOIGT
D. McDONALD
For your file.
RPU

Project: National Sorghum and Millet Improvement Program (030)

Location Bir Al-Gohum Research Farm Sana

From: Harnek S. Sandhu Sorghum/Pearl Millet Breeder.

In the fall of 1979 selections were made of a range of genotypes for possible use under various situations in the future. Following agronomic characteristics were taken into consideration while selecting:

Plant height, days to 50% flowering leaf angle, head type, drought tolerance, leafiness, seed size, seed color, test weight, grain and stover yield and disease reactions.

Major objectives of this project are (a) to develop improved varieties for rain fed or low moisture environments and (b) to develop a gene pool of adapted germ plasm from which to select improved recombinants in the future. To achive this goal more than 4500 lines are planted here at Bir Al-Gohum research farm. These 4500 lines are assigned to 21 different tests depending upon their status of selection and testing. An out reach test consisting of 50 superior genotypes (1000 plots) has been planted in nine different micro climatic conditions either at farmers field or at Government farm or at other cooperating research farms. Superior lines from this out reach test will go directly into seed increases, thus enhancing the new cultivar release.

Sixty five advance generation early maturing sorghum genotypes have been added to this program from ICRISAT (India). Thirty cold tolerant advance lines of sorghum from Mexico Al-Batan (CIMMYT) are also included in this years testing program. Another thirteen lines of sorghum from South Dakota State University and seven lines from Prainie valley Nebraska are included in different tests. One hundred thirty six new lines of Pearl Millet were obtained from ICRISAT India to increase the genetic diversity of this crop.

Although this project deals with sor ghum and P. millet improvement but two new crops maize and soybean are added to the testing program.

Twenty four genotypes of corn and 136 of soybean will be tested at Bir Al-Gohum research farm to give Yemen Arab Republic Government an additional information. A new crop of Guar is included in tests at Jarubah research farm.

Land preparation included ploughing and leveling. Before making the ridges each field was floated with a light float. In my opinion all the four fields still need leveling to apply uniform irrigation water. This year no basal fertilizer was added at the time of land preparation But a new method of foliar application was tried for the first time at Bir Al-Gohum research farm. Double presowing irrigation was practiced to insure uniform germination. Weeds which are annual event were problem this year again in the early stages of stand establishment, the research plots have to be hand weeded. Proper chemicals for weed control are not available in Yemen. Also the specefication of different chemicals are not k·own under Yemen soil and climatic conditons. An immediate attention should be given to exploit this discipline.

In the next few pages I will decribe each test, its objective, number of genotypes to be evaluated, experimental design, characteristics to be studied, plot size and future testing plans for selected entries.

Test 80-001 Head rows

This test consists of 450 entries. Plot size is 5 meters long and 0.75 meter wide. Rows are 0.75 meter apart. Hills in each row are 20 cm. apart. Three to five seeds were planted per hill and later on plants were thinned to two to three plants per hill. Purpose of this test is to evaluate each genotype for agronomic characteristics such as maturity, height, days to 50% blooming, stalk stiffness, leafiness, head type, drought tolerance, seed size, seed color, grain and forage yield. Design of this experiment is single row plots which are unreplicated. Two heads of superior genotypes will be selfed to procure pure seed for further evaluation of the selected entries in 1981 in a preliminary yield trial.

Test 80-002 Preliminary yield Trial I

This test consists of 256 genotypes plot size is 5 meters long and 0.75 meter wide. Rows are 75 cm apart. Hills in a row are 20 cm apart and

three to five seeds are planted per hill. Later on plants were thinned to 2-3 plants per hill. Experment design is randomized complete block design and each entry is replicated twice. Purpose of the test is to find out genotype superior for both grain and stover. Other agrnomic characteristics such as plant height, maturity, days to 50% blooming, stalk strength, leafiness, grain test weight, drought tolerance seed size, seed colr will be taken into consideration. Two to four heads of superior genotypes will be selfed for further evaluation in advanced yield trial in 1981.

Test 80-003 Preliminary yield Trial II

This test consists of 284 entries replicated twice. Purpose of this test is same as of test 80-002. Experimental design and plot size is also same. The difference is source of seed.

80-004 Early Maturity Trial

This test consists of 22 entries and is replicated twice. A number of lines with very early maturity of 80-90 days as compared with 120-150 days to 50% bloom were selected for possible future use. Early maturity has a built in advantage against adverse climatic conditions through escape. Purpose of this test is to identify high yielding early lines tolerant to drought. Plot size in this care is 5 meter long and 0.75 meter wide. Hills are spaced 20 cm apart in a row and 3-5 seeds are planted per hill. Later these were thinned to 2-3 plants per hill. Design of this experiment is randomized complete block. Three to four heads will selfed to produce pure seed for further testing.

80-005 Short Grain Yield Trial

This test consists of 88 entries replicated three time. Plot size is 5 meter long and 1.5 meter wide. Hills are spaced 20 cm apart. Three to five seeds were planted per hill and later thinned to 2-3 plants per hill. Purpose is to evaluate forage and grain yield. High grain yielding type could be used in hybrid development program. Experiment is planted in a randomized complete block design. Genotypic characteristics such as plant height, percent stand maturity lodging, grain and forage yield, test weight, seed size, seed shape and colour will be recorded. Three to five plants will be bagged to produce selfed seed for next year testing.

80-006 Advanced Yield Trial

This test consists of 54 entries. Superior lines from preliminary yield test or from superior head rows are included in this test. Plot size is 5 meters long and 1.5 meter wide. Experiment design is randomized complete block design and each entry is replicated three time. There are 24 hills per row and each hill was planted with 3-5 seeds which was thinned to 2-3 plants per hill. Purpose of this test is to evaluate superior lines before putting those into elite yield test. Each entry will be evaluated for agronomic characteristics such as plant height, leafiness, head type, leaf arrangement maturity, lodging, bird damage, test weight, seed size, seed shap, seed colour, grain as well as forage yield. Six to eight heads will be selfed to produce pure seed for Elite yield test.

80-007 F1 Populations

In this test 179 rows from 71 entries are planted. Rows are 5 meters long. Déstance between rows is 0.75 meters. Hills are 20 cm. apart. Most of the crosses included in this test were made at Bir Al-Gehum research farm using CK60A as a male sterile. Pollen parent were the promising lines from different tests. Some of the F1 lines were introduced from Mexican program. Promising F1 plants will be selfed and tested next year. Purpose of this experiment is to incarporate desireable genes from exotic lines into local adapted cultivars.

80-008 Male Parents

This test comprises of 54 entries. Purpose of this test is two fold. One, to test these entries for both grain and forage yield. Two, use the most promising lines as pollen parents on selected male sterile plants. Selected lines from test 80-008 will go directly into Elite yield test in 1981. While selecting emphasis will be laid on grain yield, plant height, earlyness, fodder yield, test weight, drought resistance, resistance to insects and pests. Six to eight head will be selfed to procure pure seed.

80-009 Elite Yield Test

This test comprises of 31 most advanced entries. Lines included in this test have been tested for two/three years for thir superiority.

These entries are replicated three time. Purpose is to evaluate each entry for yield of grain and forage. Visual evaluation for other agronomic characteristics will also be made. Plot size is 3 rows six meter long. Rows 0.75 meter apart. Each entry is replicated three time in a randomized complete block design. Three to five seeds were planted per hill and later on thinned to 2-3 plants for each hill. There are 24 hills in each row. Observations will be made for plant height, 50% blooming date, head type, resistance to lodging, yield per plot, test weight, forage yield, seed size, leaf habbit and resistance to bird damage. Ten heads of each entry will be selfed to provide pure seed for increase if the genotype proves to be superior and is selected for release.

80-010 Out reach test

This test has 50 entries in it. Each entry is replicated twice at 7 locations (Jahana, Amran, Redha, Maheweit, Bany Maymoon, Sana, Jarubah) and 3 time at two other locations (Damar and Mafhag). Purpose is to evaluate each entry for grain and forage yield in ten different micro climatic conditions. Entries will be tested both in rainfed as well as under limited irrigation conditions. Plot size is a single row 5 meter long and 0.75 meter apart. Each entry is replicated twice or thrice in a randomized complete block design. Hills are spaced 20 cms. apart and each hill was seeded with 3-5 seeds and later on thinned to 2-3 plants per hill. Observations will be taken on agronomic characteristics such as plant height, maturity, lodging resistance, head type, grain and fodder yield, test weight, seed size and seed color, leaf habit and resistance to bird damage. Best lines from this test will be increased for seed multiplication.

Test	Location	No. of Entries	Rep	No. of rows
80-010	Mafhag	50	3	150
80-010	Damar	50	3	150
80-011	Damar	8	1	56
80-010	Mahaweit	50	2	100
80-010	Jahana	50	2	100
80-010	Bany Maymoon	50	2	100
80-010	Radha	50	2	100
80-010	Amran	50	2	100

Test	Location	No. of Entries	Rep	No. of rows
80-010	Sana	50	2	100
80-010	Jarubah	50	2	100
80-001	Jarubah	450	1	450

80-012 Maize Observation Test

This test consists of 24 entries. Four of these entries were introduced from USA. Seed of these four introductions was made available through Prairie Valley Seed Incarporation. Purpose of this test is to evaluate these genotypes for their adaptation to high altitude and low rainfal conditions. Plot size is three rows 5 meters long and 0.75 meter apart. Each entry is replicated three time in a randomized complete block design. Two seeds were planted per hill and hills were 20 cm. apart. Later on thinning was done to leave only one plants per hill. Observations will be recorded on flowering, plant height, ear node height, lodging, maturity, yield of dried shelled corn and any disease or insect incidence.

80-013 International Sorghum Preliminary Yield Trial I

This test consists of 20 entries. Seed was obtained from ICRISAT (INDI Lines are composed of early maturing genotypes of advanced generation lines from the breeding populations and their crosses with other elite material. Objective of this trial is to test agronomically elite material and assess their performance for direct and indirect use in the national sorghum improvement program. The design of the experiment is randomized complete block design with two replications. Plot size is 5 meters long and 1.5 meters wide. Rows are 0.75 meter apart and hills are spaced 20 cm. apart. Observations will be made on height maturity, leaf habit, head type, grain size and grain color, yield both of grain and stover. Two to four heads will be selfed to provide pure seed.

80-014 International Sorghum Preliminary Yield Trial II

This test consists of 45 entries. Seed of this test also was obtained from ICRISAI (India). Lines in this test are of medium to mid late maturity and come from genotypes of advanced generation lines from the breeding populations and their crosses with other elite material. Objective

of this trial is to test agronomically elite material and evaluate this performance for direct and indirect use in the national sorghum improvement program. The design of the experiment is randomized complete block design with two replications. Plot size is 5 meter long 1.5 meter wide. Rows are 0.75 meter apart and hills are spaced 20 cm apart. Observations will be made on plant height, maturity, leaf habit, head type, grain size, grain color, grain yield and fodder yield. Two to four selected heads will be selfed to procure pure seed.

80-017 Pearl Millet Yield Nursery

This test consists of nine pearl millet genotypes. Purpose is to evaluate the adaptation of these genotypes in the upland area of Sana province. Plot size is 5 meters long and 1.5 meters wide. Rows are 0.75 meter apart. Five to six seeds were planted per hill and later on thinned to 2-3 plants per Hill are 20 cm apart. Randomized block design with three replications is used in this test. Data will be recorded on maturity, plant height, days to 50% blooming, percent stand, Grain and stover yield.

80-018 International Pearl Millet Adaptation Trial I

This test consists of 21 pearl millet genotypes. Seed of this test was obtained from ICRISAT (India). Objective of this test is to evaluate the performance of a spectrum of representative genotypes from several breeding programs in different locations. Plot size, experiment design is same as in test 80-017. Observations will be recorded on plant height, maturity, percent stand days to 50% blooming, lodging, grain and stover yield.

80-019 International Pearl Millet Adaptation Trial II

This test also consists of 21 pearl millet genotypes. Seed of this test was obtained from ICRISAT (India). Objective of this test is to evaluate the performance of different genotypes from several breeding programs in different locations. Plot size, experiment design and observation schedule is same as in test 80-017.

80-020 International Pearl Millet Downey Mildew Nursery.

This test consists of 50 pearl millet genotypes. Objective of this test is to evaluate these lines against Sclerospora sp which cause downey mildew

Plot size is 5 meters long and 0.75 meters wide. Rows are 75 cm apart. Plants are planted in hills 20 cm apart. Five to six seeds were planted per hill and later on thinned to 2-3 plants per hill. Randomized complete block design with two replications is used in this experiment. Observation on disease reaction along with agronomic characterestics will be recorded.

80-021 Sorghum Introductions

This test consists of 54 genotypes introduced from different sources. Thirteen of these lines came from South Dakota State University, Brookings, South Dakota USA and seven from Prasie Valley seed corporation, Nebraska USA. Thirty lines came from sorghum improvement program at Al-Batan Mexico. Objective of this test is to evaluate the performance of a spectrum of representative genotypes from several breeding programs in different parts of the world. Al-Baten research station in Mexico is located at same elevation as is Sana and the station is devoting significant time on the development of cold tolerant day neutral strains of sorghum. Plot size in this test is 5 meters long and 1.5 meters wide. Rows are 0.75 meter apart. Hills are 20 cm. apart and are seeded with 3-5 seeds per hill which was thinned to 2-3 plants per hill. Randomized complete block design with two replication is followed in this test. These new introductions will be observed very critically for phenotypic characteristic and selected entries will be added to the sorghum gene pool of Yemen Arab Repub One to two selected heads will be selfed to procure pure seed. Observations will be recorded on plant height, days to 50% blooming, maturity, leaf habit, head type, seed size and seed colour, stalk stiffness and grain as well as stover yield,

80-023 International Pearl Millet Adap. Trial 1979 (I)

This test consists of 22 genotypes obtained from ICRISAT (India) objective of this test is to evaluate the performance of a spectrum of representative genotypes from several breeding programs in different locations. Plots are 5 meters long and 0.75 meters wide. Rows 75 cm apart and hills are 20cm. apart. Four to six seeds were planted per row and later on thinned to 2-3 plants per hill. Observations on Agronomic characteristic such as plant height, maturity, days 50% blooming, percent stand grain and stover yield will be recorded. Experiment design is randomized complete block design replicated three time.

80-025 International Pearl Millet Adaptation Trial 1979 (II)

This test also consists of 22 genotypes obtained from ICRISAT (India Objective, plot size, experiment design, observation to be taken are same as in experiment 80-023.

80-011 Seed Multiplication

This test comprises of eight selections which have been tested over a period of three to five years and have accomplished superiority over the other lines. Best entries from this test will be tested in a bigger out reach plots over a wide variety of climatic conditions and superior one will be recomended for release.

All these 21 tests at Bir-Al-Gohum research farm are being grown under limited mousture conditions inorder to enhance expression of drought tolerance. Out reach test at Jahana, Damar and Radha are also under similar conditions where as test at Mafhag, Bany Maymoon Amran and Maheweit are rainfed.

Training:- Four technicians and a counter part from Ministry of Agriculture were given instruction and training at the job in making selections, preparation of seeds, lay out of test plots, planting, disease and insect identification. In the comming few weeks they will be shown the process of selfing, emasculation and pollination.

Suggestions for improvement:-

It is an urgent need to locate a new research station because the facilities at the present site are not adequate. Part of research farm has been taken over by a local personal and another part is lost to a new road. Water availability is not adequate. Old well is almost dry and discharges only half a liter per second. New well, pumps only 2 to 2½ liter per second where as it used to produce 5 liters.

Due to shortage of irrigation water and land I have to limit the number of replications and plot size which adversely effects the test precision

List of 1980 Tests Planted at Bir Al-Gohum Research Farm

Test No.	Test	No. of Entries	Rep	Plot size	No. of rows
80-001	Head Rows	450	1	0.75x5m	450
80-002	Preliminary Yield Trial I	256	2	0.75x5m	512
80-003	" " " II	284	2	0.75x5m	568
80-004	Early maturity Trial	22	2	"	44
80-005	Short Grain Yield Trial	88	3	1.5x5m	528
80-006	Advanced Yield Trial	54	3	"	324
80-007	F1 Populations	71	1	0.75x5m 1.5x5m 1.25x5m	179
80-008	Male parents	54	1	1.5x5m	54
80-009	Elite Yield Tests	31	3	2.25x5m	279
80-010	Out Reach Tests	50	2	1.5x5m	900*
80-011	Seed Multiplication	8	4	5.25x5m	224
80-012	Maize Observation Test	24	3	2.25x5m	216
80-013	International Sor. Pre. Yield T I	20	3	1.5x5m	120
80-014	" " " " II	45	3	1.5x5m	270
80-015	Nat. co-op Maize Obser. Test	Seed not received		-	-
80-016	" " Pearl Millet Ob. Test	" " "		-	-
80-017	Pearl Millet Yield Nursery	9	3	1.5x5m	54
80-018	Inter. Pearl Millet Adap. Trial	21	3	1.5x5m	126
80-019	" " " " " 78	21	3	"	126
80-020	" " " DM Nur.	50	2	0.75x5m	100
80-021	Sorghum Introductions	54	2	1.5x5m	216
80-023	Inter. Pearl Millet Adap. Trial (79) I	22	3	0.75x5m	66
80-025	" " " " (79) II	22	3	0.75x5m	66

* Out Reach Tests of Their Location

Test No.	Location	No. of Entries	Rep	Plot size	No. of rows
80-010	Al-Rasah (Mafhag)	50	2	0.75x5m	100
80-010	Damar	50	2	"	100
80-010	Mahaweit	50	2	"	100
80-010	Jahana	50	2	"	100
80-010	Bany-Maymoon	50	2	"	100
80-010	Radha	50	2	"	100
80-010	Amran	50	2	"	100
80-010	Sana'a	50	2	"	100
80-010	Jarubah Tiham will be planted in August	50	1	"	100
80-001	Jarubah " " " "	450	1	"	450

Date : August 5, 1980

To : Chester S. Bell A.D.O.

From : D. Markarian, Project 030

Subject: Quarterly Report, Jarubah Farm

In compliance with your July 12, 1980 letter, on July 28, 1980 I submitted a final voucher and returned $13,387 U.S. Dollars to the controllers office to close out the $50,000 Jarubah Site Development advance account. Thus the total expenditure for the approximate four month development period was $36,613. The projected budget was $50,000 per month and for not spending the allocated funds, the project could be considered a failure. The reasons for this descrepancy and the delay in building construction are several but foremost was the need to divert effort toward actual preparation of land to meet the deadline of August 1 planting of research materials and rotation crops on the newly acquired land. Recognizing the dual goals of the farm it was necessary to establish priorities at an early date in order to accomplish both: 1) Residence and office development were limited to putting the house trailer in operation and 2) The irrigation system had to be at least partially functional.

On June 15th we planted the first sorghum and millet trial and the following week the trailer was moved to it's permanent concrete pad.

The physical development of the Jarubah Farm as of this date is as follows:

1) The original farm site as occupied by 024 was about 3 hectars. The present farm includes 11.9 hectares. The farm has been accurately surveyed and a plot map has been made.

2) A new well was drilled and was operational before site development started in March. Recently we empirically tested the out-put of the well and found it to be 8 liters per second. Our contract specifications were 20 liters per second. We have contacted the Engineer from Caprari (the pump and motor supplier) and it appears the angle head supplied was of the wrong ratio. At any rate, at this time the problem is not complicated. We were not satisfied with the original alignment of the propeller shaft between the engine and the angle head. We have not corrected this yet but close observation of the unit during operation indicates no malfunction. Regardless, we plan to realign the system eventually.

3) A water tower 8 meters high was constructed adjacent to the well, two fiber glass water tanks (1500 gallon total) have been installed and a 500 foot 2" galvanaized iron pipe supplies the trailer. The system from the well to the trailer outlet is sealed so that water at any top is safe to drink. Quality of water is good although occasional surges of muddy water appear due to newness of the well. Supply outlets were roughed in to the Russian building.

4) A septic system constructed to U.S. standards has been completed and connected to the trailer as well is "roughed" in to the Russian building.

5) A water reservor of 1/4 acre has been constructed to accept the well discharge. Total capacity of the reservor is one acre foot.

6) A canal system with steel control gates is completed for about 1/3 of the farm.

7) Three terraces have been leveled. Two have been irrigated and planted. The June 15th sorghum millet trial received it's second irrigation on July 22. The second terrace was planted to a "Guar" trial.

8) The 35 KVA caterpillar generator has been repaired and installed in a new building of concrete block. An underground cable supplies the trailer which is now complete with water, sewer, and sufficient power to operate two built in a/C units. We do not feel airconditioning is normally necessary for Jarubah except during the wind and dust storms when all doors and windows must be closed.

9) Maintenance of the original pump and motor on the 024 site has been a source of constant problems. In the four months of our presence several propeller shafts have been broken and considerable time devoted to repairs. Recently we poured a new concrete block for the engine and accurately aligned the shaft to the motor and angle head. However the problem is not completely solved as the years of operation with a loose coupling bushing to the motor crankshaft have warn the shaft to the point where it must be replaced to reduce vibration and eventual engine or propeller shaft damage.

Recent inspection indicates this bushing has become loose to the point where the universal joint near the engine will break in a short while. A new replicament shaft will cost 1,000 Rials.

I would urge a new motor unit for this well be purchased and a new angle head be installed at the same time a new motor will cost about 24,000 Rials and a new angle head about 7,000. The time lost in attempted repairs on the worn unit is greatly impeding our progress on station development.

In a meeting today with Ahmed Al-Gashmi the Ministry representative we agreed jointly to supply the villagers with water only from 5:30 to 7:00 am. and from 5:00 to 7:00 pm. There would be no daytime use of the pump and 024 would irrigate only at night. Currently the pump operates often from 6:00 am. until 10:00 pm. for local water supply. This is essentially an unacceptable situation as it represents an undue demand on the pump and abuse of our generosity. Because we supply water free of charge and in large a amount we are attracting users many miles from the village that was originally serviced. Ahmed Al-Gashmi has agreed to disperse the people who will descend upon our own well and station site upon facing the limited water supply.

Ahmed Al-Gashmi also indicated a contract for 120,000 Rials has been signed for a new water tank.

10) Recently we supplied 024 sufficient water to irrigate the east portion of this operation. In time we will construct a canal to water the west portion and at that time 024 can be serviced by either the new well or the old one. Shortly we expect to be supplied with river water and we plan to exploit this source for the entire farm.

Research Results

The June 15th planting of sorghum consisted of a collection of 41 forage, sugar, and syrup types from the U.S. Of these, only one, NK 300 was equal in emergence and growth to the local check. We have ordered a large seed sample of this one and will extensively test it this year. The ultimate value of a forage sorghum is only known after one year of growth during which time it will be harvested at least 3 times and compared to local varieties. Following is a list of the varieties that will enter the second phase of testing this year.

	Variety	Use
1.	NK 300	Forage
2.	Collier	Sugar
3.	Dole	Syrup
4.	Bowardurra	Forage
5.	Ellis	Forage and syrup
6.	Gooseneck	Sugar
7.	Surrac	Forage
8.	Wray	Sugar

Although NK 300 is the only one that appears to compete with the local varieties the others being retained were satisfactory in emergence, and, something less in total yield will be acceptable of any sugar content is achieved in this environment.

Of the millets planted (6 varieties and a local check) nothing has appeared of promise except at this date one single plant has flowered and will set seed extremely early.

The Ministry representative, Ahmed Al-Gashmi, has expressed a desire we plant some cotton to help encourage production in the area. I have instructed the Jarubah staff to do so in my absence. Cotton is a high water demand crop and I am hoping its presence on the farm will be a basis for increased river water diverted for our use. We will also plant local field corn for this reason.

The sorghum collection at Sana will be planted during August to determine performance under Jarubah conditions. Following is a list of crops that will be under various tests this year.

1. Sorghum
2. Millet
3. Guar
4. Soy Beans
5. Cotton
6. Cowpeas
7. Sesame
8. Field corn

At this time, one might consider Jarubah an operational venture that could be continued by local counterparts. Future development will be fairly easy due simply to the presence of shade, portable water, electricity, septic system, and modern housing. This initial effort has not been without sacrifice of body and mind and credit must be given to the several peace corps volunteers and Yahia Abdo who with difficult desert conditions. And finally, the entire operation would have failed without the organizational, logistic, and financial arrangements made by Tracy Atwood.

Dr. Deran Markarian

PLANS FOR ENSUING PERIOD

1. Continue with 4th. year field research on sorghum and millet relative to breeding and agronomic work.

2. Return seed to Yemen for the outreach program. This seed will be from the lines of the Yemen sorghum collection which was increased at the University of Arizona and Puerto Rico.

3. Obtain additional seed of more forage types, such as sorghum/sudan grass. Seed will be used in future plantings.

4. Continue development of the Al Jaruba research station. Eventually a model farm of 12 hectares, all level, with irrigation capability would be complete. Facility is basically operational for planting now. Further work is planned for a river irrigation system and to make existing building structures useable. Specific examples of future work planned include:

   a. Building a dam for river water use in the arterial distribution system.
   b. Determining whether surface canals or pipe is the most practical for irrigation.
   c. Construct two pumphouses.
   d. Provide another living unit in addition to the existing trailer.
   e. Install 12 inch well casings in lieu of the existing 6 inch.
   f. Build more roads.
   g. Renovate the existing Russian building for use as needed. Space will be required for harvest activities and storage.

5. Continue training of on-farm practices used at Al Jaruba to include:

   a. Staking a field for leveling with a tractor.
   b. Complete irrigation system planning to incorporate the construction and installation of applicable gates.
   c. Planting and initial readings on emergence.
   d. Required actions on irrigation, insect control, herbicide application, readings taken through harvest. Data collected by harvest on water usage should portray the value of consumptive water used.

6. Tentative plans have been made to send a weed control specialist from the University of Arizona to Yemen during November 1980.

7. Tentative plans have been made to send Dr. Robert L. Voigt, Chief of Party on this project for 1977-1979 and currently campus Assistant Technical Director/Plant Scientist, to Yemen during the month of October 1980 for a three-fold purpose:

   a. To observe and become familiar with the progress of the 1980 breeding and germplasm development and other activities of the project. As the first and also tenured breeder with the University, Dr. Voigt will give the necessary program continuity through future years of project activities.

b. Obtain numerous and varied data from project files and recheck data computations for 1979 project activities for a 1979 report. Many of these data are only available in-country. Dr. Voigt's full tour of duty in-country ended before planting time in 1979, but there were no replacements, so he made all plans for the 1979 year and returned on TDY to plant and harvest. He had no opportunity to assemble the necessary data to write a 1979 report while in-country.

c. Yemen has been selected by Title XII, INTSORMIL (International Sorghum-Millet) as a linkage country. Dr. Voigt is the plant breeder on the University of Arizona Title XII INTSORMIL program and will be instrumental in the development of sorghum and millet drought germplasm for improvement of dryland production in linkage countries such as Yemen. Dr. Voigt plans to initiate cooperative procedures with the appropriate offices and personnel in Yemen while on TDY.

RECOMMENDATIONS COVERING CURRENT NEEDS IN FIELD OF ACTIVITY

1. There is an urgent need to select and develop a new field experiment station site at Sana'a. A short term professional with expertise in soils and field experiment station development and operation should assist with this. Past research results indicate it is pointless to continue the complete present Sana'a station. A new station which could be used in conjunction with Sana'a University would offer many possibilities. A cooperative arrangement such as this could provide increased cross-talk and sharing of knowledge and techniques in additional areas of crop science, animal science and horticulture.

2. Replacement vehicles requirements need to be determined and entered in the pipe line to ensure constant availability. Procurement through Jidda, Saudi Arabia needs to be investigated. It may be a quicker and as an economical source as ordering from the States.

3. Small row crop equipment, such as a Bear Cub tractor, with front end hydraulics for tillage needs to be procured. Smaller land levelers are also needed.

4. Trained project mid-level technicians need to be authorized for regular employee status. They are presently authorized on a temporary duty basis. Regular status would: provide more continuity in meeting project objectives; eliminate the time and effort required in recruitment of frequent turnovers; reduce the per diem paid in country; reduce the transportation costs involved.

5. The future status of the Al Jaruba farm needs to be determined in regard to the desires of the Government of Yemen, Ministry of Agriculture. For example, do they desire experiments on cotton and corn with water utilization studies on each?; do they plan on taking charge of the local employees and provide a Yemeni farm manager? If question two above occurs, where will the farm manager live? Desires need to be determined in advance to provide sufficient planning time to comply with same.

6. It is recommended the Government of Yemen, Ministry of Agriculture, contact the local customs officials and work out a procedure whereby project supplies can be expedited to the addressee. This recommendation applies to air shipments arriving Sana'a and surface shipments arriving Hodeida.

ADDITIONAL INFORMATION PERTAINING TO THIS CONTRACT

1. Annual research reports for the years 1976, 1977 and 1978 were finalized and distributed to applicable agencies.

2. The two soil moisture meters, mentioned in the last semi-annual report as lost enroute, were never located in Sana'a. Appropriate action was taken by the vendor as a result of a claim submitted by the University of Arizona for reimbursement. A check for the price of the meters was received and returned to the Yemen account by the office of the Director, International Agriculture Programs.

3. Considerable time and effort was expended to get University of Arizona approval to hire a short term vehicle mechanic for Yemen. In the final analysis, New Mexico State University hired an individual through the Title XII program. The individual, Mr. Orean departed for Yemen in August.

4. Dr. R. Phillip Upchurch visited Sana'a April 24-28, 1980 conducting administrative business.

5. A complete man month study was conducted in May 1980 at the request of the Agency for International Development Office in Washington, DC (USAID/W). This study compared man months used verses authorized and contemplated through March 31, 1981. Results of the study were sent to Washington for their use in preparing amendment five.

6. Amendment five to the contract was received in early July 1980. It was reviewed, signed and returned to the Contracts Office, USAID/W. Amendment five gave the University of Arizona responsibility for the support services in Yemen independent of USAID, but to a lesser degree than originally planned. By the end of this reporting period, the contracts office had been contacted to provide the funds authorized by amendment five. These funds were urgently needed to fulfill new contract obligations.

7. Two graduate students from the University of Arizona, College of Agriculture, were recruited and sent to Yemen for a 90 day period starting in July 1980. Both were well qualified. Mr. Lubbers assisted Dr. Markarian in the development of the Al Jaruba farm. Mr. Younes assisted Dr. Sandhu with the plant breeding aspects of the Sana'a station and out-reach tests. Replacements for these two individuals were being screened by the end of this reporting period.

8. An administrative officer, Mr. Arfa, was also recruited for a 90 day period in Yemen starting in July 1980.

9. Pouch service for project supplies which had been working without a hitch came to an abrupt halt, without any warning, during April 1980. All small boxes of supplies sent via pouch in March 1979 eventually were returned to the University of Arizona. The returned boxes were sent to Yemen via air with routing specified as Transworld Airlines to Rome, Yemen Airlines to Sana'a. Supplies routinely arrive Sana'a in 7 to 10 days from Tucson International Airport via this routing. Fast service from Tucson to Sana'a via air did

not solve the problem, however. Local Yemeni customs officials still refuse to let our personnel gain access to supplies shipped for any number of a variety of reasons. At the present time, we are sending original purchase invoices, bills of lading and associated documents to the University employee in Yemen for whom the supplies are addressed. Duplicate copies are also forwarded with the shipment. It is not authorized, condoned or used by our employees, but it is obvious the officials would process supplies shipped much faster if money crossed their palms. Pouch service for parcels weighing less than two pounds is apparently working satisfactorily. Very few supplies weigh less than two pounds, however. What we really have are two ways to ship: surface which takes 6 months, or air. We recently sent a box containing sorghum seed, plus a suit and coat to Mr. Jeffrey Lee at USAID/W. He agreed to repackage and forward on to Yemen for us. The seed was for future planting. The suit and coat had been left in El Paso, Texas by a Yemen Minister of Agriculture on a recent visit.

10. Examples of items procurred and shipped to Yemen during this reporting period for this contract include: Suburban shift case boots, floor mats, vehicle pistons, propane cutting tips, regulator units, etc. Ms. Clarissa Douglas, USAID/W was also nice enough to forward some soybean seed to Yemen for us, since the pouch was not working.

11. The Title XII Design Team hand carried vehicle parts to Yemen for us in May 1980. This projects funds were not used.

12. Tractor lug bolts, a draw bar, and hitch stabilizer parts are examples of items procurred for Tuskegee Institute and shipped for them to Dr. Don Merkley in Yemen via air. This projects funds were not used.

13. As mentioned in the last semi-annual report, we requested a bid from General Motors Overseas Distribution Corp. for a chevrolet pick-up and a suburban to be used in Yemen by New Mexico State University employees in conjunction with the Title XII program. General Motors responded to our bid request and the 1981 vehciles will be built in September 1981. Shipping arrangements have not been made by General Motors yet.

14. Two representatives from the Yemen Ministry of Agriculture, Mr. Wood from the Consortium for International Development, and Mr. Peterson, Yemen Agriculture Development Officer visited the University of Arizona campus and Campbell Avenue Farm 10-12 August 1980.

15. Heads containing seed from the approximately 1500 Yemen Sorghum Collection lines which were grown out in Puerto Rico continued to be returned to the University of Arizona for processing. The heads were threshed; seed was cleaned, labeled, and stored in approximately 50 seed storage boxes at the Campbell Avenue Farm seed storage facility.

16. Dr. Deran Markarian, Yemen Chief-of-Party returned to the States in late August 1980 to attend and participate in a farm systems seminar conducted in Mexico, Guatemala and Honduras. He was on campus September 3-5, 1980 conducting business associated with this project. His discussions on progress

made and slide presentation of the Al Jaruba improvements were very interesting and informative. Private in-depth discussions were also conducted with the University of Arizona, Dean, College of Agriculture; Head, Department of Plant Sciences; Director, International Agriculture Programs; Campus Assistant Technical Director/Plant Scientist; Procurement Officer/Research Assistant.

17. Routine administrative support occurred in the following areas on the University of Arizona campus: processing of forms for short term travel approval; forwarding bi-weekly reports and finalized annual reports to appropriate agencies; telegrams and letters on supplies desired, procurred and shipped; processing of a claim for Dr. Sandhu on a portion of his food shipment which was lost enroute to Yemen via air; monthly reports on telegrams sent and long distance telephone calls made.

18. The vehicle parts and supplies which were procured by the University of Arizona and shipped to Yemen in 1979 continue to be high demand items. This stockpile of parts is being rapidly depleted due to continued maintenance requirements of other agriculture projects. The supply of oil filters for some vehicles has been depleted. In country replacements for these filters are difficult or impossible to locate. Vehicles from the Ibb School, Horticulture 024 project, the Mission, as well as the Sorghum/Millet 030 project are being repaired from this in-country source of spare parts.

19. The Sorghum/Millet project provided vehicles, to the maximum extent possible, for the Title XII teams that visited during this reporting period. With the on-going functions at Sana'a, Al Jaruba and the outreach tests, providing the Title XII teams transportation meant a temporary curtailment of some of our planned activities.

20. The Sorghum/Millet project and the Mission have vehicle maintenance service garage areas at Sana'a. A useable vehicle is the heart of getting project activities accomplished. Without a means of transportation, many activities just can not be completed. Due to this fact, the Sorghum/Millet vehicle service area provided required maintenance to other Agriculture projects in-country. Examples include: servicing for lubrication and oil changes; engine tear down, rebuild or change; brake repair and clutch work.

Administrative Report

This segment of the semi-annual report covers expenditures and personnel employed under the contract. A report on foreign national trainees is not applicable since the contract does not include any provisions for participant training.

Expenditures

The latest inception to date computerized report dated 10-02-80 is included on the following pages. This report is for the month ending 09-30-80. The report is generated by the University of Arizona computerized accounting system and can be used to determine overall expenditures from original inception of contract through 09-30-80.

Immediately following the computerized report is an analysis prepared by the College of Agriculture accountant for this project. All deficits projected are based on appropriated funds. We do not forecast any deficit against authorized funds at this time. See page 57 for this analysis.

REPORT NO. GA3204
ACCOUNT NO: 867381
ACCOUNTANT: J COOK & P BROWN
NEXT LEVEL: 050011

UNIVERSITY OF ARIZONA
ITD RESPONSIBILITY REPORT
FOR MONTH ENDING 09-30-80
YEMEN SUPPORT 5010410120

PAGE NO 1
RUN DATE 10-02-80

MATLOCK W G
036AGI

AGENCY: AID GRANT NUMBER: AID-ME-C-1304 AMD 4 2009 MTDC AWARD AMOUNT: 1042221 TERMINATION DATE: 06/30/81

**** CURRENT MONTH ****				**** INCEPTION TO DATE ****			
BUDGET CHANGES	EXPENDITURES	ENCUMBRANCES ADDED		BUDGET	EXPENDED	ENCUMBRANCE BALANCE	BUDGET AVAILABLE
			PERSONAL SERVICES & ERE	424,764.00			
			SALARIES				
	10,035.17	2,890.39	SALARIES		321,251.00	69,085.00	390,336.00-
	10,035.17	2,890.39	CLASS TOTAL		321,251.00	69,085.00	
			WAGES				
			STUDENTS - HOURLY		1,104.00		1,104.00-
	119.40	5,273.99	REGULAR WAGES		33,403.00	8,156.00	41,559.00-
	5,418.88		NON-STUDENTS (TEMP)		17,211.00		17,211.00-
	5,538.28	5,273.99	CLASS TOTAL		51,716.00	8,156.00	
			ADJ TO SAL E/OR WAGES				
			ADJ TO SAL E/OR WAGES		1,682.00		1,682.00-
			ADJUSTMENTS TO ERE		244.00		244.00-
			CLASS TOTAL		1,926.00		
			EMPLOYEE RELATED EXPEND				
	2,056.20	805.87	EMPLOYEE RELATED EXPENSE		23,512.00	12,045.00	35,557.00-
			DO NOT USE		248.00		248.00-
			FICA TAX		8,312.00		8,312.00-
			DO NOT USE		11,377.00		11,377.00-
			DO NOT USE		3,702.00		3,702.00-
	2,056.20	805.87	CLASS TOTAL		47,151.00	12,045.00	
	17,629.65	9,970.25	CATEGORY TOTAL	424,764.00	422,046.00	89,285.00	86,568.00-

+ 7,646 - 9/28/80 - Sal & Wages
1001 - ERE 9/25/80
430,692

REPORT NO. GA3204
ACCOUNT NO: 867381
ACCOUNTANT: J COOK & P BROWN
NEXT LEVEL: 050011

UNIVERSITY OF ARIZONA
ITD RESPONSIBILITY REPORT
FOR MONTH ENDING 09-30-80
YEMEN SUPPORT 5010410120

RUN DATE 10-02-80

MATLOCK W G
036AGI

AGENCY: AID GRANT NUMBER: AID-ME-C-1304 APD 4 2000 MTDC AWARD AMOUNT: 1042221 TERMINATION DATE: 06/30/81

* * * * CURRENT MONTH * * * *				* * * * INCEPTION TO DATE * * * *			
BUDGET CHANGES	EXPENDITURES	ENCUMBRANCES ADDED		BUDGET	EXPENDED	ENCUMBRANCE BALANCE	BUDGET AVAILABLE
			OPERATING EXPENDITURES	162,666.00			
			OUTSIDE AND PROFESSIONAL				
	662.68		CONSULT-LECTUR/SPKRS-EXP		1,523.00		1,523.00-
			OPERATIONAL ADVANCE			70,000.00	70,000.00-
			OTHER OUTSIDE + PROFESS		10,564.00		10,564.00-
	662.68		CLASS TOTAL		12,087.00	70,000.00	
			OFFICE SUPP. AND POSTAGE				
			OFFICE SUPPLIES		610.00		610.00-
			PRINTED FORMS		140.00		140.00-
	18.42		STAMPS STMPD ENV & CARDS		1,877.00		1,877.00-
	30.00		POSTAGE- OTHER		434.00		434.00-
	48.42		CLASS TOTAL		3,061.00		
			OPERATING SUPPLIES & SVC				
	63.35	145.76	RESEARCH SUPPLIES		29,210.00	146.00	29,356.00-
			D.P. SUPPLIES - OTHER		205.00		205.00-
			EDUCATIONAL SUP - OTHER		93.00		93.00-
			RECREATIONAL SUP - OTHER		95.00		95.00-
			ANALYSIS SHOPS		10.00		10.00-
	63.35	145.76	CLASS TOTAL		29,613.00	146.00	
			MAINTENANCE AND REPAIRS				
			OFFICE EQUIPMENT		75.00		75.00-
			REPAIRS + MAINT - OTHER		1,006.00		1,006.00-
			CLASS TOTAL		1,081.00		

REPORT NO. GA3204
ACCOUNT NO: 867381
ACCOUNTANT: J COOK & P BROWN
NEXT LEVEL: 0>0011

UNIVERSITY OF ARIZONA
ITD RESPONSIBILITY REPORT
FOR MONTH ENDING 09-30-80
YEMEN SUPPORT 5010410120

MATLOCK W G
036AGI

AGENCY: AID GRANT NUMBER: AID-NE-C-1304 AMD 4 2000 MTOC AWARD AMOUNT: 1042221 TERMINATION DATE: 06/30/81

**** CURRENT MONTH ****				**** INCEPTION TO DATE ****			
BUDGET CHANGES	EXPENDITURES	ENCUMBRANCES ADDED		BUDGET	EXPENDED	ENCUMBRANCE BALANCE	BUDGET AVAILABLE
			TELEPHONE				
			TEL EQUIPMENT CHARGES		96.00		96.00-
	18.50		LONG DISTANCE CHARGES		3,661.00		3,661.00-
			WIDE AREA TEL SERVICE		103.00		103.00-
			AZ TEL SERVICE (ATS)				
			TELEGRAPH		828.00		828.00-
	30.00		TELEPHONE-OTHER		1,040.00		1,040.00-
	48.50		CLASS TOTAL		5,728.00		
			PRINTING AND PHOTOGRAPHY				
	72.60		PRINTING - OTHER		495.00		495.00-
	72.60		CLASS TOTAL		495.00		
			RENT				
			REPRODUCTION EQUIPMENT		681.00		681.00-
			LEASE + RENTAL - OTHER		778.00		778.00-
			CLASS TOTAL		1,459.00		
			UTILITIES				
			UTILITIES - OTHER		461.00		461.00-
			CLASS TOTAL		461.00		
			MISC AND OTHER COSTS				
			FREIGHT OUT		21,651.00		21,651.00-
			STDT OR PART REG FEES SP		8,741.00		8,741.00-
	123.25		OTHER EXPENSES		7,612.00		7,612.00-
	123.25		CLASS TOTAL		38,004.00		
	1,018.80	145.76	CATEGORY TOTAL	162,666.00	91,989.00	70,146.00	531.00

REPORT NO. GA3204 UNIVERSITY OF ARIZONA PAGE NO 4
ACCOUNT NO: 867381 ITD RESPONSIBILITY REPORT RUN DATE 10-02-80
ACCOUNTANT: J COOK & P BROWN FOR MONTH ENDING 09-30-80
NEXT LEVEL: 050011 YEMEN SUPPORT 5010410120 MATLOCK W G
036AGI

AGENCY: AID GRANT NUMBER: AID-NE-C-1304 AMD 4 2000 MTDC AWARD AMOUNT: 1042221 TERMINATION DATE: 06/30/81

**** CURRENT MONTH ****				**** INCEPTION TO DATE ****			
BUDGET CHANGES	EXPENDITURES	ENCUMBRANCES ADDED		BUDGET	EXPENDED	ENCUMBRANCE BALANCE	BUDGET AVAILABLE
			TRAVEL	145,265.00			
			IN-STATE TRAVEL				
			IN-ST MILGE+VEH PRIVATE		4.00		4.00-
			IN-ST MILGE+VEH ST VEH		1,330.00		1,330.00-
			IN-STATE SUBSISTENCE		180.00		180.00-
			IN-ST REG FEE-CONFERENCE		10.00		10.00-
			PERSONAL EFFECTS TRANS		29,552.00		29,552.00-
			IN-ST OTHER TRAVEL EXP		64.00		64.00-
			CLASS TOTAL		31,140.00		
			OUT-STATE TRAVL-DOMESTIC				
			OUT/DOM SUBSISTENCE		1,390.00		1,390.00-
			OUT/DOM PUBLIC TRANS		2,052.00		2,052.00-
			OUT/DOM OTHER TRAVEL EXP		4,857.00		4,857.00-
			CLASS TOTAL		8,299.00		
			OUT-STATE TRAVEL-FOREIGN				
			OUT/FRN MILGE+VEH PRIVAT		78.00		78.00-
		9,239.00	OUT/FOREIGN SUBSISTENCE		4,532.00	39,102.00 <8,245>	43,634.00-
		2,300.00	OUT/FOREIGN PUBLIC TRANS		35,526.00	9,665.00 <2,300>	45,191.00-
			OUT/FOREIGN REG FEE-CONF		453.00		453.00-
			OUT/FOREIGN OTHER TRAVEL		564.00	75.00	639.00-
		10,539.00	CLASS TOTAL		41,153.00	48,842.00	
		10,539.00	CATEGORY TOTAL	145,265.00	80,592.00	48,842.00	15,831.00

10/14/80 (pc)

REPORT NO. GA3204
ACCOUNT NO: 867381
ACCOUNTANT: J COOK & P BROWN
NEXT LEVEL: 050011

UNIVERSITY OF ARIZONA
ITD RESPONSIBILITY REPORT
FOR MONTH ENDING 09-30-80
YEMEN SUPPORT 5010410120

RUN DATE 10-02-80

MATLOCK W G
036AGI

AGENCY: AID GRANT NUMBER: AID-NF-C-1304 AMD 4 2000 MTDC AWARD AMOUNT: 1042221 TERMINATION DATE: 06/30/81

**** CURRENT MONTH ****				**** INCEPTION TO DATE ****			
BUDGET CHANGES	EXPENDITURES	ENCUMBRANCES ADDED		BUDGET	EXPENDED	ENCUMBRANCE BALANCE	BUDGET AVAILABLE
			CAPITAL	79,053.00			
			EQUIPMENT				
			OFFICE EQUIP + FIXTURES		357.00		357.00-
		160.00	RESEARCH,TEST,OTHER TECH		16,474.00	160.00	16,634.00-
			INVENTORY EXEMPT		1,599.00		1,599.00-
			EQUIP - FEDERAL TITLE		61,915.00	1.00	61,916.00-
			EQUIP - OTHER TITLE		9,057.00		9,057.00-
		160.00	CLASS TOTAL		89,402.00	161.00	
		160.00	CATEGORY TOTAL	79,053.00	89,402.00	161.00	10,510.00-
			INTERNAL CHGS AND ALLOCA				
			INDIRECT COSTS				
	3,729.69		IND COSTS - APPLIED	138,252.00	107,857.00	30,394.00	1.00
	3,729.69		CLASS TOTAL	138,252.00	107,857.00	30,394.00	1.00
	3,729.69		CATEGORY TOTAL	138,252.00	107,857.00	30,394.00	1.00
	22,778.14	13,814.01	ACCOUNT TOTAL	950,000.00	791,886.00	238,829.00	80,715.00-

+ 7,646.00
1,001.00
9/28 Payroll
800,533
1,729 IDC @ 20%
802,262

Yemen Contract Analysis
#867381

	Contract Budget (Authorized)	Core Budget (Appropriated)	Expended thru 9/30/80	Committed thru 9/30/80	Project Balance 9/30/80	Operational Advances *	Balance	Projected 10/1/80-3/31/81	Projected Balance 3/31/81
Salaries									
Field Staff	188033	180473	182654	542	(2723)			32364	(35087)
Short-Term Personnel	59223	50966	36035	546	14389			5600	8789
Local Hire	5451	12886	10469	0	2417			0	2417
Campus Personnel	136337	85118	109807	280	(24969)			15530	(40499)
Fringe Benefits	58281	35200	47395	205	(12400)			10286	(22686)
Subtotals	447325	364645	386360	1569	(23286)		(23286)	63780	(87066)
Allowances	80259	83919	65091	167	18661		18661	13938	4723
Per Diem	0	7000	6102	30854	(29956)		(29956)	0	(29956)
Travel & Transportation	210242	184465	74490	7440	102535		102535	30000	72535
Other Direct Costs	27810	13591	20300	0	(6709)	70000	(76709)	13200	(89909)
Equipment & Supplies	244402	158128	140263	307	17558		17558	26400	(8842)
Housing Support	12054	0						5454	(5454)
Local Employees	197100	0						120000	(120000)
Overhead	229628	138252	109586	8038	20628	14000	6628	49274	(42646)
Subtotals	1001675	585355	415832	46806	122717	84000	38717	258268	(219549)
Totals *	1449000	950000	802192	48375	99431	84000	15431	322046	(306615)

PERSONNEL EMPLOYED UNDER THE CONTRACT

Dr. Robert P. Upchurch, Head, Department of Plant Sciences, spent 15% of his time as Campus Technical Director.

Dr. Robert L. Voigt spent 35% of his time as Campus Assistant Director/Plant Sciences.

Dr. William G. Matlock, Director for International Agriculture Programs, spent 10% of his time performing duties as Campus Coordinator.

Mr. Dale E. McDonald, Department of Plant Sciences, spent 40% of his time performing procurement and support related duties.

Mr. Carl Scaggs, Department of Plant Sciences, spent 52% of his time as a Research Technician.

Mr. Deran Markarian, In-County Agronomist and Chief-of-Party, spent 100% of his time in that capacity in Yemen.

Mr. Harnek Sandhu served in Yemen 100% as a Plant Breeder.

Ms. Anna Fisk and Ms. Virginia Henry, Department of Plant Sciences, spent 35% of their time performing secretarial duties related to the project.

A. David Arfa, Edward L. Lubbers, and Mohammed H. Younes served as Extra Technical Help in Yemen from July 15, 1980, through September 15, 1980.

Mr. Orrin Webster spent 3% of his time through June 30, 1980, as a back-up to Dr. Voigt in the management of the Yemen project. Mr. Webster is a renowned field expert in the Sorghum-Millet area.