

Consultant's Final Report

DAI/Afghanistan: Drainage Rehabilitation Project

Helmand Valley, Afghanistan

For

Contract Period

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Prepared for Development Alternatives, Inc (DAI)

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Executive Summary

PROJECT GOALS

1. DAI's Project is the first major irrigation rehabilitation project in the Helmand region since the fall of the Taliban. It was initiated to support an alternative development or opium poppy eradication program. In the past, the central Helmand irrigation system produced about 50% of all the opium produced in Afghanistan. This project was presented to the farmers as a political and economic answer for the loss of opium poppy as the primary cash crop in the region.

PROJECT METHODS

2. Helping Afghan Farmers Organization (HAFO) is the Afghan NGO sub-contracted to implement this project. HAFO has appropriate institutional and technical skills, regional experience, contacts, influence, and knowledgeable leadership to successfully implement this project.

3. Hand-labor Organization: The hand-labor force is organized around the water masters (*mirabs*), an indigenous labor unit associated with most Afghan irrigation systems. Organizing labor around such a system allows the project to mobilize relatively large numbers of men in a short time.

4. Recommendation: *Consultant/trainers with experience in the Islamic world's irrigation systems should establish short-term training programs for the mirabs, farmers, and HVA personnel. While the initial focus will be on improved water use, it will lay the groundwork for a more formalized system of water users associations, water charges and broader local responsibilities for the operations and maintenance of their irrigation system.*

5. Recommendation: *One member of the aforementioned team should also be a specialist in water and soils labs to survey and inventory the existing facility in Lashkar Gah that has been out of action for some decades. Some of the people who worked in this lab before the war still reside in the area.*

6. Abundant hand labor is available in central Helmand especially during the winter work season, up to the crop harvest season in May. Much of this labor is already organized into work groups. With the demise of opium poppy cultivation, there is an increased number of unemployed laborers. As the DAI project has developed, we have had more and more demands to hire more laborers.

7. Heavy Equipment Work: The deep drains, outlet drains, and waste ways are so large, deep and with such a heavy flow of water that it is necessary to use heavy equipment to clean them. We turned to Helmand Construction Unit, an

organization that has had the responsibility to maintain the central Helmand's irrigation system since 1958. HCU has a limited amount of very old equipment, including 4-5 draglines, 3 Komatsu bulldozers, two Russian dump trucks and two lowboy trucks. There is also a loader, 2 backhoes, and 2 D-8 Caterpillar bulldozers that could be put in working order, but spare parts are needed.

8. Recommendation: HCU is a long established organization with effective and energetic leadership. HCU has the best repair and maintenance facility manned by the most effective team in the region. With some support, they represent an important potential base for an effective heavy equipment facility. However, it is an organization with limited operational funds. It needs to be paid regularly and it needs help. Old equipment needs spare parts; the mechanics need more tools and welding equipment; and HCU could use some new heavy equipment such as draglines for irrigation system maintenance.

9. Poppy: Any development/rehabilitation project initiated Helmand must have a continuous poppy eradication dialogue with the farmers and local government. Both the intensive use of hand labor and the rehabilitation of the central Helmand irrigation system are key elements in the war on narcotics. Since the Soviet departure, the opium trade has transformed this agricultural economy from one of semi-subsistence/cash crop, to an economy fully based on cash crops. The farmers and the labor force are well aware that poppy as a cash crop is on the way out.

10. Since at least 1997, both the government officials and the farmers in central Helmand have said: (i) Poppy is an evil crop; (ii) If help would come to rehabilitate the central Helmand irrigation system so that the farmers could return to their traditional double-cropping system, they would stop growing poppy; (iii) Projects should employ large numbers of people (labor intensive) and put additional income into the hands of farm labor; (iv) help is needed with alternative crops, credit, and marketing.

11. The DAI project has maintained a dialogue with the farmers and government officials concerning the relationship between the present development efforts and poppy eradication.

CENTRAL HELMAND IRRIGATION SYSTEM

12. Drains and Irrigation: Drainage water is used extensively for irrigation in both Nad-i-Ali and Marja. In Nad-i-Ali, for example, no drainage water has reached its outlet into the Helmand River in some years. In both Marja and Nad-i-Ali, much of the drainage water from irrigation ditches is being used to irrigate areas that would have been classed as "out-of-project" areas before the war. In Marja, water pumps have been noted along virtually all deep drains pumping drainage water for irrigation.

13. Through the years, sections of central Helmand have become water-short for a variety of reasons: (i) Part of this shortage relates to the increase in double cropping and perhaps to the increase in cotton production. (ii) The miss-use or over-use of water by central Helmand farmers has always been a problem. There are no water charges and once the water leaves the main canals, it is in the hands of the local water users groups. (iii) Farmers' attitudes towards water use are: "If a little water is good, more is better." (iv) The drought has limited the flow of available water in the Helmand River; (v) the Helmand system has not seen complete maintenance for about 20 years, and water flows through this silted and damaged system at a much reduced rate; (vi) damage or general degradation has occurred to the system, like the wash-out of the Shamalan canal; and (vii) probably more land is under cultivation now in Central Helmand than at any time in the history of the Boghra Canal system.

14. Recommendation: Since the situation has changed significantly over the past ten years, it is important to repeat the 1993 DAI /ESC satellite assessment of land use in Helmand. This will prove very useful for planners.

15. Drainage water samples were taken from deep drains in Nad-i-Ali. This water was tested at Colorado State University. The conclusion was: "This water is classified as medium salinity hazard irrigation water. It should not cause problems due to salt accumulation in the soil if a moderate amount of leaching occurs and soil drainage is adequate." This conclusion emphasizes the importance of DAI's present drainage system rehabilitation activities. It also alerts us to the potential problem associated with the use of drain water in undeveloped "out-of-project" areas.

16. Recommendation: A project agronomist and agricultural engineer should survey the large out-of-project areas and the marginal in-project areas to identify and prioritize problem areas and make recommendations for action.

17. Wells and Irrigation: Another answer to the water shortage is wells, either drilled or hand dug.

18. Recommendation: It will be useful to survey the local well drilling contractors for more details on well depths, water quality and well distribution.

19. Tile drains: Nad-i-Ali's drainage system includes sub-surface tile drains installed in the 1940s and 1950s. More than 80% of these tile drains (20 out of 24) are still functioning. The water from these tile drains is used by many of the farm families as a drinking water source. They apparently considered the water purer than the regular drain water.

20. Recommendation: Drainage specialists should examine the 50-year old tile drains still functioning in the area, re-assess the effectiveness of the original spacing of these drains and reconsider the use of buried drains for any future

land development in central Helmand. Buried drains provide more agricultural land.

21. Conglomerate: Two meters below the surface of much of Nad-i-Ali and some of Marja there is an impermeable, natural conglomerate layer, with a density about the same as poured concrete. This results in a natural problem for drainage in the area when combined with farmers' over-use of water and a clogged drainage system.

22. Recommendation: *The Project should search for soils maps documenting the distribution of this layer in USAID/HVA/SCS/US Bureau of Reclamation archives. If not found, over time, systematically survey and map the formation's distribution and depth. This would be useful for drainage planning purposes.*

23. Bridges: Six concrete bridges built for vehicle traffic cross various drains in the inhabited district of Nad-i-Ali. These serve hundreds of cars, trucks, and tractors. In addition, farmers developed at least two fords. These fords suggest a potential need for additional bridges in the area.

24. Individual Tractor Crossings: In 1946 when the construction of the Central Helmand irrigation system began, there were no tractors in the Helmand region. The irrigation system was not originally built for mechanized farming. People plowed with oxen. Settlement plots of land were relatively small with few bridges for the movement of tractors. Two developments over the past 20 years compound the problem of tractor movement: (i) The original settlement pattern was for the farmers to live in consolidated villages, but in recent times the farmers have been moving onto their lands, and building housing compounds. (ii) Today, hundreds of farmers in the Helmand have purchased tractors. To move their tractors across the network of ditches and drains, the farmers have built crude bridges and culverts, many out of sticks and rocks. Most of these structures constrict the flow of water through the system.

25. Recommendation: *Re-evaluate the traffic flow of vehicles and tractors through the area and the use of existing bridges. More vehicle bridges may be needed. If so, local communities should participate in their construction.*

EXISTING CASH CROPS

26. Peanuts and Cotton: Peanuts are one of the most rapidly developing cash crops produced in central Helmand, in direct competition with cotton. They also represent a good alternative crop for opium poppy. Given the markets, we may assume next year will see an even greater increase in peanut production. Peanut's primary competition as a cash crop is cotton. Both crops are planted in the spring beginning in March.

27. Recommendation/question: *The early spring planting of either peanuts or cotton does not allow double cropping with fall planted wheat as it does with the traditional hot season crops of melon, vegetables, mung bean and corn. A farmer must skip the fall planting of wheat (or poppy) in order to do a spring planting of peanuts or cotton. Is there a short season winter crop to fill this short gap or is there a productive reason from this skipped season?*

28. Private Cotton Gins: There are some 15-20 privately owned cotton gins in central Helmand where most of the region's cotton is grown. To some degree, they compete with the government cotton gin in Lashkar Gah. The Karzai Government has closed all privately owned cotton gins o/a October, 2002.

29. Recommendation: *Help formalize an organization of regional cotton gin owners to present a unified front to the Ministry of Small Industry, which should be supporting privately owned cotton gins.*

30. Vegetables as a Cash Crop: There is a very active wholesale vegetable bazaar in Lashkar Gah that exports to many regional towns and cities. Some farmers have started using plastic sheeting held up by sticks to produce a greenhouse to plant early vegetables beginning in February. This "greenhouse" development can be seen in all three central Helmand districts: Nad-i-Ali, Marja and Shamalan. This effort has mostly involved individual experimentation without technical assistance but generally has been successful.

31. As opium poppy is being eliminated as the dominant cash crop, farmers' interest in vegetable production is growing rapidly. Helmand farmers are generally smart farmers, double cropping, and benefiting from a cash economy. Many are experimenting with new cash crops and are learning rapidly. But the marketing of their produce clearly worries them. Some sell direct to local markets. Some sell to the wholesale market in mid-season when the prices are low. They need technical help in producing earlier crops and help with marketing, storage, and shipping. They need organizational help.

32. Compared to some other areas of Afghanistan, the central Helmand region is wealthy. The seasons and the altitude allow double cropping. The Helmand River provides a good source of irrigation water. There is a good local market for fruits and vegetables. They have a cash economy. Even the smallest bazaars in the region have 2-3 varieties of citrus, pears, apples, grapes, pomegranates, plums, squash, greens, eggplant, okra, tomatoes, cucumbers, carrots, cauliflower, onions, beans, spinach, radishes, turnips, and potatoes. They have several varieties of melons and watermelons that have long been a cash export crop for the region. Lettuce, celery, broccoli, asparagus or cabbage is not currently on the market, but one farmer requested broccoli and asparagus. Cabbage was grown in the area in the 1970s.

33. The farmers recognize vegetables as a viable cash crop but they are less sure of markets for mass produced crops. There have been some bad experiences over the past few years with price drops as bumper crops of carrots and cauliflower come to market simultaneously and nothing could be exported, and there was no cold storage facilities.

34. Recommendation: One of the first agricultural specialists to be brought into Helmand must be a marketing expert, to look at the complete production chain from growing to processing and storage requirements for fruits and vegetables.

OTHER REPAIR AND CONTRUCTION SITES

35. Roads: Except for the Kandahar to Herat highway, all the roads in Helmand province are unpaved. Given the limited rainfall unpaved roads are not a problem if periodically maintained. (Lashkar Gah averages about 4 inches a year in good years.) However, maintenance did not occur in more than 20 years. The two main routes to the main highway are the old MKA gravel roads from Lashkar Gah to the highway (going to Kandahar) and from Lashkar Gah to Girishk (going to Herat.) To improve the movement of goods and produce into and out of central Helmand, and to reduce wear and tear on all vehicles, these two main roads require grading, graveling, compaction. This involves approximately 120 km. of road. Several desert shortcuts associated with these roads should be studied for improvement and up grading. All of the main farm roads in the area, including many along the canal and drain service roads, also need repair and grading. This involves some 500 to 1000 km. With the right approach, farmers -- especially those with tractors -- will contribute to this rehabilitation.

36. The Shamalan Canal: This canal is a major branch of the Boghra Canal and runs parallel with the Helmand River. In some places it runs dangerously near the Helmand River and to date has been cut in two locations.

37. Recommendation: A riverbank erosion specialist should study this area, as well as the other similar areas noted in the UN Shamalan report, and design a series of canal protection bunds.

38. S-10.7 Lateral: All the water coming down the old Shamalan canal is diverted into the S-10.7 lateral. This lateral was not designed to take this much water, and it has not received any serious maintenance for about 20 years. Because of silting, its carrying capacity is considerably less than the original design at a time while more water is being pushed through the system. The extra water tends to erode out the bottom of the canal in some areas and around the structures in other areas. Most of the silting in Helmand canals is from wind blown sand and dirt with the build-up causing shoulders along the edges of the canal rather than water-borne silt being deposited at the bottom.

39. Recommendation: *In the near future, de-silt the S-10.7 lateral (40 km) and wasteway drain at the end.*

40. Nad-i-Ali Schools: Two schools are near the Nad-i-Ali Wolis Woli office: the old high school now functions as the boys' school and the old primary school now functions as the girls' school. In total, there are about 900 students attending in shifts. The girls' school appeared less damaged than the boys' school. The boys' school is in need of major repair. New windows, some roof repair and some whitewash would do much to enhance the school atmosphere.

MISCELLANEOUS ISSUES

41. NGOs Working in the Helmand Region: Over time, the number of smaller NGOs -- both Afghan and foreign -- has increased. In Helmand there are 15 or 20 NGOs, many with offices, staff, and vehicles. Most NGOs do not bother to coordinate their activities with the government nor with each other. While the NGOs are generally staffed with well meaning people, it appears that much of the funding goes to rent and vehicles. How to consolidate these organizations, improve the services being funded, and put more of the money into productive activity remains a difficult question.

CONCLUSION – THE WEALTH FACTOR

42. More wealth is found in Helmand than in most other parts of Afghanistan. The narcotics trade helped generated some of this wealth, but it also relates to the double cropping and cash cropping system that started with the construction of the central Helmand irrigation system, beginning in 1946. The region's wealth is reflected in the liveliness of the local cash economy. Throughout central Helmand, hundreds of automobiles are owned by prosperous farmers. Many farmers have their own generators. Butane cookers and water pumps are common. Three to four new and used tractor dealers operate in Lashkar Gah. Tractors are mostly Massey-Fergusons. Gas stations with modern pumps are everywhere. People have money and are looking for places to invest. The residents of Helmand are innovative people with assets and the knowledge to experiment with new things, but they are not gamblers. They are mostly rural farm people and their real wealth is in their land. They are looking for ways to increase profits from their land with new crops and new farming techniques. They appreciate the work on the drains and know the importance of good drainage. They will actively participate in new agricultural programs and work with new crops that will increase their profits.

Introduction

This report describes work accomplished during the contract period, to analyze key events and observations, and to make recommendations for future project activities in the central Helmand region. Where useful, I will offer the historical setting and statistics for a better understanding of present conditions. The observations and recommendations will not be limited to the drainage project to allow a better understanding of the region, central Helmand, its economy and its potential. The judgments, conclusions, and recommendations represent those of the consultant.

PROJECT GOALS

This project was initiated in the context and support of a national opium poppy eradication program. In the past, the central Helmand irrigation system produced about 50% of all the opium produced in Afghanistan. This project and the MCI irrigation rehabilitation project of 1999 were presented to the farmers as a political and economic answer for the loss of opium poppy as the primary cash crop in the region. There has been much talk in the media (on the radio for the people of Helmand) about the international community helping to re-build Afghanistan after 20 years of war. But there has been limited action in the field. This is the first major irrigation rehabilitation project in this region since the fall of the Taliban. The goals are intertwined but generalized below:

- The rehabilitation of the irrigation drainage system will allow for better and a wider range of cash crops, and put more cash into the local economy through increased agricultural production.
- This project is to employ as many laborers as possible in the labor-intensive effort to systematically clean and rehabilitate the central Helmand drainage system, beginning in the district of Nad-i-Ali. Direct payment of hand-labor will also help infuse the local economy with cash.
- Heavy equipment is only used on the main drains where the drain water flow is greater and the amount of silt to be removed is greater, making the use of hand labor less effective. There are, however, a wide range of sizes of drains and problems associated with drain rehabilitation. The rule of thumb is: if we can do the work by hand, we do not use heavy equipment. The primary goal is to put people to work - productive work. It is important in the work context to utilize the existing, but ill-equipped Helmand Construction Unit (HCU) for heavy equipment support. One goal is to help re-build this long-standing organization to regain its importance to the overall Helmand Valley irrigation scheme.

- This combination of large numbers of hand laborers being paid regularly, heavy equipment in use and productive drain rehabilitation work will get the attention of people in the region and have a major political impact.

PROJECT METHODS

Helping Afghan Farmers Organization (HAFO) is the Afghan NGO sub-contracted to implement this project. They have maintained an office in Lashkar Gah since 1996 (with a brief absence during the months of potential violence associated with the fall of the Taliban government). They have fielded projects in the area, including the time of anarchy that preceded the rise of the Taliban. They were subcontractors for Mercy Corps International (MCI) during the 1998-1999 Boghra Canal Rehabilitation Project that focused on the de-silting of the Boghra canal using mostly hand labor. In addition to work in Helmand, HAFO organized, built and maintains a vocational training school in Kandahar and has had several, small rural works projects in that region. HAFO also has projects in the areas of Herat, Ghazni, Kabul and the Shomali Plain, north of Kabul. The HAFO director, Civil Engineer Sayed Jawed, is from a village between Girishk and the Boghra canal intake, a graduate of Lashkar Gah high school and the Kabul University Faculty of Engineering.

HAFO has the institutional and technical skills, regional experience, contacts and influence, and the knowledgeable and motivated leadership to successfully implement this project.

Hand-labor Organization: We have organized the hand-labor force around the indigenous labor organizing elements associated with the Central Helmand Irrigation system, namely the watermasters (*mirabs*) and local labor organizers. Organizing our labor through this system allows us to mobilize relatively large numbers of men in a very short time. In this case, it took one day to mobilize 100 men, time necessary to buy the shovels. It could have been 1,000 men if we had had the funds and the shovels available. There is no shortage of ready labor in the region. This labor force is drawn from three economically marginal groups: (1) Sharecroppers who are non-land owners but who have generally resided in the area for long periods. In this region, sharecropper relations tend to be long term; (2) Day laborers who also reside in the area; (3) Traditional migratory labor that comes into the area for the winter work season from the foothill and mountainous regions to the north. Many of these northern areas in north Helmand, Oruzghan and Ghor remain under snow in this work season. This migration pattern has existed since at least the beginning of this modern irrigation system but probably dates from ancient times.

This area had a flourishing irrigation agricultural-based civilization by the time of Tamerlane who passed through the area at the end of the 14th century, took out a

dam across the Helmand River and laid waste to the land, people and economy. The ruins of very large habitations in this region date back hundreds of years and parts of the modern Boghra canal follow roughly the alignment of an ancient Boghra canal.

Given the economically marginal nature of this hand labor force, it is important to emphasize here the need for a project to have ample funds available to pay the labor force on a regular weekly basis once the project starts. This is not a stratum of Afghan society with quantities of excess cash on hand but one more likely to be in chronic debt. Regular payment of a reasonable wage for work done with no games being played will do much for good public relations. HAFO faithfully has been meeting this payment schedule even when there have been long delays in the arrival of DAI reimbursing funds.

Recommendation: Evaluate and monitor the present system for the reimbursement of funds already spent by HAFO with an eye to speeding up the process.

An early royal decree dating from the 1960s states that the government is responsible for water distribution from the main canals of the central Helmand system. Responsibility shifts to the indigenous water users groups (associations) once it leaves the main canals. And these groups are also responsible for maintaining the channels that carry the water to the farms. The government is responsible for maintaining only the main canals.

Each of the farm channels off the main canals has a watermaster or *mirab* with responsibility for distribution of the water to the farmers and to mobilize farmers as needed to maintain the channels. This system of community responsibility is called *ashar*. The farmers who share the water from their channel select each *mirab*. According to *Mirab* Obaydullah (past chief *mirab* of Nad-i-Ali) there are some 72 *mirabs* serving the district of Nad-i-Ali between Loy Manda siphon and Marja.

In theory, the selection/appointment of a *mirab* is a democratic process but commonly the *mirab* is the most influential khan in the area (the man with the most land and/or relatives) or someone closely associated with him. In some locations the position may be more or less hereditary. In the end, however, as things work in this society, the water generally is distributed in a relatively equitable manner. There are always complaints - especially from the men at the lower ends of a channel. And a turn over of *mirabs* is not common. Commonly, households on a channel are related by blood, marriage, tribal affiliation or some combination of these. As work crews, these men generally work well together since they all know each other and they have worked together in the recent past with their organizer/supervisor. One of our project supervisors, not from the area, had difficulties with one of these work crews when he attempted to divide it to

work in two different locations. The organizer informed him that if he wanted the group for work, they stayed together.

There are also labor organizers (*jamidars*) throughout the area responding to the local need for large numbers of laborers at certain times of the year, like opium poppy harvest time. Again, these men tend to organize labor on the basis of kinship, friendship, local residence or a combination. They may come from settlements in central Helmand or from the areas of migration previously mentioned. These labor organizers commonly have 20 to 50 men in their groups.

As a side note, through the years various U.S. and foreign consultants have observed that water use by the farmers could be improved and that water charges should be initiated as an element of more economical water use. Water charges could also help support the maintenance costs of the system. Few changes have occurred in water use over the past 30-40 years.

Recommendation: Bring in a team of consultant/trainers, with experience in Muslim world irrigation systems, to establish short-term training programs for the mirabs, farmers, and HVA personnel. While the starting focus would be on improved water use, it would establish the groundwork for a more formalized system of water users associations, water charges and broader local responsibilities for the operations and maintenance of their irrigation system. Initially this could be a series of short-term assignments for consultants/trainers/planners. But a long-term association with an irrigation training institution such as Texas A&M or Colorado State University would be needed.

Recommendation: One member of the aforementioned team should be a specialist in water and soils labs and be prepared to survey and inventory the existing facility in Lashkar Gah that has been out of action for some decades. He would make recommendations and take actions to re-establish this facility even at a most rudimentary level. The two storied building housing the facility appears to be in relatively good condition but with most of the windows broken and no staff other than a watchman. Some of the people that worked in this lab before the war still reside in the area.

There used to be a chief *mirab* for each of the districts to organize and coordinated the efforts of the farm channel *mirabs*. For example, both Marja and Nad-i-Ali had a chief *mirab*. Sometime in late 2002, the two positions were merged into one, the result of local political disagreements.

As noted, there is an abundance of hand labor in central Helmand especially during the winter work season and up to the winter crop harvest seasons in May, and much of it comes already organized in work groups. There is an increased number of unemployed hand labor in the region with the demise of opium poppy cultivation. As noted, as the project developed, we had more and more demands

to hire more laborers. Elders insisted that we hire local labor as we worked into a village's land holdings. "Local" labor here means men from a particular village. We had at least two major organized labor demonstrations in Nad-i-Ali requiring government intervention. I suspect that we will have more demonstrations if we are not in a position to hire more people. If and when project funding increases and arrives on a regular basis, the project can easily increase its work force by several thousand men. The only constraints will be the recruitment of effective, local technical supervisory staff and communications. The labor force is there and ready to work...at least up to the beginning of wheat harvest season in May.

Again, rather than re-invent the wheel, we use the well-established, indigenous system of labor organization that already functions to maintain elements of the irrigation system.

As noted, by the end of this contract period we had 525 men working with shovels cleaning mid-size drains. And they had cleaned some 60,000 meters or 60 kilometers of drain in Nad-i-Ali. This represents about one half of all the mid-size drains in this district cleaned by hand in some 3 months. As of 15 April 2003 they are working the drains in the area of Loy Bagh village and are perhaps three-quarters of the way through the mid-size drains of Nad-i-Ali.

Heavy Equipment Work: The deep drains, outlet drains and waste ways are so large, deep and with a heavy flow of water that it is more effective to enlist the support of heavy equipment, draglines, in cleaning. We turned to the organization that has had the responsibility to maintain the irrigation system since the departure of Morrison-Knutsen Afghanistan (MKA) in 1958. This organization is variously known as Helmand Construction Unit (HCU), HACU and HCC. The director of HCU is Mr. Farouq, appointed to the job after the fall of the Taliban. He is in his 30s, from a well-established family in Lashkar Gah apparently with Kabul connections. Although he is without engineering training or experience, he is very active, ambitious, and has a very cooperative attitude. He wants HCU to be active in the rehabilitation of the region. His staff is rather elderly, dating from the 1970s. Likewise his mechanics are mostly from the same generation but are geniuses at keeping the old equipment running under the horrible conditions. The technical staff does include a Kabul University Engineering Faculty engineer in his 50s, with experience in Pakistan during the war years.

HCU has a very limited amount of very old equipment from a variety of sources. The HCU equipment yard at Chah-i-Anjir looks more like a junkyard than an equipment yard. They have 4-5 draglines, one from the US, the rest from the USSR. They have no spare parts and cannibalize or repair parts when there are breakdowns. There are 3 Komatsu bulldozers mostly in running condition, two Russian dump trucks and two low-boy trucks for moving the heavy equipment. There is a loader that can be put in working order, 2 back-hoes (not working at this time) and 2 D-8 Caterpillar bulldozers in need of spare parts.

Like the hand labor force, HCU is an organization with very limited, if any, operational funds. It needs to be paid regularly and frequently to keep the operation alive. During the short life of this project there have been long delays in the movement of funds for work already completed. On at least two occasions, HAFO stepped in to make some payments.

Recommendation: There is need to take a closer look at the present funding system with an eye to speeding up the process of payment for work already completed. Delayed payments keep our contractors in debt.

As noted, by the end of this contract period, we had 2 old draglines working in Nad-i-Ali and 2 working in Marja. They had cleaned about 13,000 meters of deep drain by the end of January 2003. But through this work period, there were many lost workdays due to equipment breakdowns.

Recommendation: HCU is a long established organization with effective and energetic leadership. It has perhaps the largest heavy equipment repair yard in Afghanistan but it needs help to regain its effectiveness: the old equipment need spare parts; the mechanics need more than their basic tool boxes and welding equipment; and HCU could use some pieces of new heavy equipment such as draglines necessary for irrigation system maintenance. The HCU mechanic and operator staff is mostly older men, with a few younger men having been added recently, but they are all skilled, experienced and energetic. HCU has the best repair and maintenance facility manned by the most effective team in the region. With some support in spare parts and equipment, they represent the greatest potential base for a quick start, effective heavy equipment facility.

As a side note, just before the war, USAID ordered some 13 new draglines. The booms and buckets arrived just as the USSR invaded the country and remain in the HCU equipment yard, unused. I have the serial numbers of this equipment. The tracks, bodies and engines of this equipment got lost in Karachi. According to Hendrix Manufacturing Co. of Mansfield, Louisiana, who still has the records of delivery, this equipment was delivered to USAID/Karachi. Jim McHugh, INL/Islamabad, was unable to trace this equipment in 1998. A few of these draglines should be ordered for any future irrigation project focused on maintenance. They could be matched with the remaining new/old booms and buckets to reduce costs.

Daily Wages vs. Cubic Meter: From October to January, HAFO and the laborers were being paid on a daily wage basis. In January we started paying HAFO under a revised contract where payment is made based on the measure of cubic meters of earth/silt removed in the process of cleaning the drains. In this section, I question the logic of this change.

Under this revised contract HCU (Helmand Construction Unit) also will be paid by the cubic meter of earth/silt they remove from the main drains with their

draglines. HAFO will make the payments. As opposed to the hourly machine rates commonly applied to machine excavations, the cubic meter payment may induce greater productivity but not necessarily better quality of excavation. The linear meter payment the project was using for the first 5 km of Deep Drain #1 would accomplish about the same thing but costs less given the experience of this project. And the calculations for payment were simpler. If an excavator is so inclined and if not carefully supervised by the contracting organization, all systems of payment for excavation are subject to abuse in the world's construction businesses.

Subcontractor HAFO is paying our hand labor force on a daily rate basis. As of 19 January 2003, when I departed, each worker received Rs 100 per day - about US\$1.75. We were about to switch back to payment in Afghanis as the currency and the economy stabilized. From the first, it was clear that daily wage payment was not the most effective manner of payment for hand labor. Some men tend to lean on their shovels. Most men work. Over time, the field supervisors have worked out a system for giving a work crew a daily linear meter quota for each man ranging between 2 and 4 linear meters of drain cleaned per man on a team. The men go home when they have finished their section of drain to the supervisor's satisfaction. As previously noted, in each drain there may be a variety of conditions to be faced in terms of difficulty of work: width, depth and side slope of drain, amount of silt to be removed, and the amount of water in the drain and vegetation growing in the drain. Sometimes the work quota coincides with the timing of a normal work day. Sometimes the men go home by 1500. Sometimes the quota section of drain is not finished by the end of the normal work day. The developing system is not perfect but productivity appeared to be higher. We have been attempting to work toward contracting out, on a daily basis, sections of drain to be cleaned. But the men are still being paid on a daily basis and we have switched to a per cubic meter payment to the contracting HAFO. The logic of paying the contractor on one basis (cubic meter) that will then pay the workers on a different basis (daily wage) is not clear.

Effective field projects should be based on relatively simple and uncomplicated criteria for payment. Presently I do not think we have such a system in place. To pay by the cubic measure system, each drain must be surveyed twice: once before the work starts and once after it is completed. Both DAI and HAFO must be represented on the survey teams and agree on the results (for heavy equipment excavation DAI, HAFO and HCU must be represented also). For the hand labor, there are several categories of drain according to size, difficulty of excavation and vegetation in the drain. Each cubic meter of earth removed will be paid on the basis of these varying categories, which means that as conditions change in a drain, each segment will have to be surveyed separately. These categories of drain conditions were drawn from some Afghan government guidelines from the distant past that may or may not apply to the present situation. Few drains are homogeneous in nature and some of the classifications of segments of drains will be based on subjective judgment calls. This will and

already has resulted in disagreements on classification of particular segments of drains between DAI and HAFO field staff.

The per cubic meter payment is to be made to HAFO, not to the men with the shovels who will continue to be paid on a daily wage basis. This method of payment will not function as an incentive for the workers to be more productive, if that is the purpose.

Following my departure, our labor force grew to some 900 men. In mid-April about 400 of the men left suddenly. Below are 3 explanations that surfaced to explain the event. The real reason for the departure of roughly half the labor force is not known. It could be one of the below, a mix of all of the below or none of the below:

- (1.) Men left for higher wages being offered for opium poppy harvest in other areas.
- (2.) Workday dispute: HAFO had developed a system, noted above, for paying a daily wage but for a set quota of work per day (generally 3 linear meters of drain cleaned per man). A work crew was allowed to go home when they finished their daily assignment, commonly by mid-afternoon. The Afghan DAI representative in the area insisted that even with the quota system, the laborers should stay at the work site until 1630, the end of the usual workday. The laborers argued that they should be allowed to go home when they finish their assigned work. Agreement could not be reached so some of the men left.
- (3.) The wheat harvest season is approaching. Many of our workers are either small landowners in other areas (the mountains and foothills) or sharecroppers with wheat to protect from the birds and harvest, so they left. This would appear to be the most likely explanation.

Project Personnel Management: This project wants to improve the economy of Helmand, in part through salaries paid to project personnel. Both DAI/Kabul and HAFO tend to hire Afghan supervisory staff above the level of the *jamedars* from outside the region. This does not put cash into the local economy. I pointed this out to both organizations, and suggested the practice be stopped. This pattern follows the Afghan precepts of personnel management: that you hire kinsmen and friends for project positions even when their qualifications may not exactly fit the job in question and even when skilled "local" people are available. Personnel hired that are not kinsmen or friends are commonly ruled by strong acts of intimidation regardless of qualifications. Intimidation is also a not-so-subtle means to eliminate personnel. There are advantages in hiring qualified personnel from Helmand rather than hiring from outside:

- They are a known quantity to the people they supervise and speak the same “language”, although they may all speak Pashto. A Wardaki may face some of the same difficulties of identification and “communication” in Helmand as a New Yorker may face in Texas. They are outsiders. A Farsi speaker is at an even greater disadvantage.
- The project is to benefit the economy of Helmand province yet most top paying positions are filled by people from other provinces, a fact not missed by the Helmand people. As in other provinces in Afghanistan, there are educated and qualified people in Helmand that can fill these upper levels of supervisory staff effectively and who are also unemployed. Helmand has a long history of contact with the outside world that has had a positive impact on training, education and innovative thinking. The Helmand farmers are some of the best in the country, if not the best.
- Locally hired people tend to be more motivated to accomplish local development activities than are outsiders. It is their region, their tribal group, and their families that will benefit from the work, and it gives them status.
- Locally hired people live at home with their families. Outsiders periodically must travel distances to visit families in other areas of the country or Pakistan. They do not bring their families with them to Helmand. Greater amounts of work time are lost through extended travel for visits and *Eids*. To date, some 20-25 workdays have been lost by outside supervisory staff for such travel. The project pays more for the outsiders than for local hire, if not in salary, then in support costs. While locals live at home, outsiders need a staff house.
- Locally hired people know the area and people and have many more local contacts that can be mobilized to address project needs. For example, our local staff has had greater success in mobilizing free tractor support to clean blocked service roads than our outsiders.

This is not a dreamed up list but represents observations made in this and several other projects in Helmand since 1998.

Poppy: Any development/rehabilitation project initiated in this region must have a continuous poppy eradication dialogue with the farmers and local government as part of any action taken. This was project policy during this contract period. Both the intensive use of hand labor and the rehabilitation of the central Helmand irrigation system, in this case the drainage system, are key elements in the war on narcotics. During the Taliban era, central Helmand was said to produce some 50 percent of all the raw opium produced in Afghanistan. Since the Soviet departure, the opium trade has transformed this agricultural economy from one of semi-subsistence/cash crop, to a cash economy based on cash crops, until

recently, mostly poppy. An example of this cash economy: our hand labor force requested payment in Pakistani Rupees rather than Afghanis as the economy shifted and the new Afghani was being introduced.

And opium poppy is a crop that demands large numbers of manual laborers both at weeding and thinning time and at harvest time. This labor is (was) paid in cash (short term) or through the well-established sharecropper system.

Agriculture work in Central Helmand has always been a major draw for the region's migratory labor, drawing laborers from the poorer, higher altitude provinces to the north, especially during the winter work season. These migratory farmers plant wheat crops (if they have land) in the rain fed or small scale irrigated areas in the mountains and foothills and then move down to the traditional cash crop region of central Helmand to seek additional work. The central Helmand agricultural system also uses full-time sharecroppers who are landless and live in the area. And so the manual labor work force in central Helmand is large, especially in winter. This system fits well with the cultivation of opium poppy - or any other labor-intensive cash crop, e.g., cotton, peanuts, vegetables. One project goal is to utilize this labor force to rehabilitate the central Helmand irrigation system and to absorb much of the labor force that has been displaced by the on-going poppy eradication effort. I believe the farmers and the labor force are well aware that poppy as a cash crop is on the way out.

Since at least 1997, both the government officials and the farmers in central Helmand have said:

- Poppy is an evil crop but it is a living,
- If help would come to help rehabilitate the central Helmand irrigation system so that the farmers could return to their traditional double-cropping system, they would stop growing poppy.
- Projects should come that would employ large numbers of people (labor intensive) and put additional income into the hands of farm labor (absorb the traditional labor force).
- Help is needed with alternative crops, credit, and marketing.

In this project there was a continuous public relations effort and dialogue with both the farmers and government officials by project personnel about the relationship between the present development effort and the poppy eradication. We reiterate that the U.S. will not fund development projects in areas that grow narcotics. The local government continues to broadcast warnings to the farmers not to plant poppy. And, as noted in the calendar of project events, in December and January, with little opposition, they successfully initiated an energetic poppy

eradication action in the province. The action appeared to be effective in the area of Nad-i-Ali where I witnessed it in the field.

From local tribal leaders and influential people we experienced apparent open support for the project. One letter addressed to USAID that came to the project from Kharoti tribal leaders and khans contained a promise not to grow poppy as a result of this drainage project work. I had numerous verbal statements from other local farmers that as long as the tribal leaders spoke against it, they would not plant poppy. This letter and such statements could be repeated on request but it does not necessarily mean that poppy could not return if the authorities do not keep up the pressure and eradication programs. Pashtun tribal leaders are respected but Pashtun society is very democratic. That is to say, tribal discipline is very weak. People tend to go their own way when it suits them. And tribal leaders do not always believe what they are saying. Tribal and local leadership support is always very important for a project and should be fostered - but project personnel should always be slightly wary of all inclusive statements.

According to the president of HVA, the final official eradication figures for central Helmand were reported as:

(All numbers in jeribs. 1 jerib=.1936 hec.=.4784 acres.)

Chah-i-Anjir	3,927
Lashkar Gah (Central)	375
Marja	12,600
Nad-i-Ali	4,972
Nawa (Shamalan)	3,975

These figures appear high but without an unbiased field survey, there is no way to know the real results of the program. As Louis Dupree always said, when dealing with official government figures, start by knocking off one digit.

According to recent (early May) contacts in the region, both Nad-i-Ali and Marja are poppy free. I have no doubt that this is the result of the project and government actions noted above.

CENTRAL HELMAND IRRIGATION SYSTEM – *Highlights*

Drains and Irrigation: Drain water is used extensively for irrigation in both Nad-i-Ali and Marja. As might be expected, more drain water is used in Marja than in Nad-i-Ali because it is at the lower end of the Boghra canal. This appears to be a relatively recent turn of events. Although many farmers complained of inadequate irrigation water by the 1975 farm economic survey, e.g., 50% in Shamalan, 49% in Marja and 17% in Nad-i-Ali, pumping water out of the drains for irrigation was not a cultural practice. Water pumps were not noted in central Helmand in the 1965, 1970 or 1975 Helmand farm economic surveys. I would guess that there

are now literally thousands of water pumps in use in central Helmand for irrigation purposes using a combination of drain water, and in other areas, well water. Central Asia Development Group (CADG) has completed a survey that I proposed in April of water pumps, tractors and other rural mechanized equipment for central Helmand but the data has not been made available. There were, for example, 15 water pumps in use along the lower 8 km of Deep Drain 1 in Nad-i-Ali in December 2002. A much greater concentration of water pumps were found in lower Marja along Outlet Drain N just before it becomes Marja Wasteway into the desert. In this area there were a series of pumps about every 100 meters and one sizable, deep cut through the drain spoils embankment/service road for a gravity-flow irrigation ditch of drain water. There are 9 similar outlets along the Nad-i-Ali Wasteway below where it crosses the Lashkar Gah-Marja road. It appears that no Nad-i-Ali Wasteway water has reached its outlet into the Helmand River in some years. Most of these Wasteway irrigation ditches in both areas irrigate areas that before the war would have been classed as "out-of-project" areas. In Marja, water pumps pumping drain water for irrigation were noted along virtually all deep drains.

Through the years, sections of central Helmand have become water-short for a variety of reasons:

- The drought has limited the flow of available water in the Helmand River and into the central Helmand irrigation system. Iran has complained that the governments of Afghanistan have been holding back the waters of the Helmand River and not living up to the Helmand Water Treaty of 1972. The Helmand River represents some 40% of the surface water of the country but I do not think water has gone over the spillway at Kajaki Dam for several years (the drought). The irrigation water in use passes through the hydroelectric tunnels under the dam and provides electricity for both Kandahar and Lashkar Gah.
- Although some work was done on de-silting the Boghra canal in the winter of 1998-99, the system has not seen complete maintenance for about 20 years. Water flows through this silted and damaged system at a much reduced rate.
- Damage done to the system, like the wash-out of the Shamalan canal at about Station 13, and the patch-up remedies provided to keep the system functioning, have reduced the efficiency of the system. For example, Gate #1 of the four intake gates on the Boghra canal will not open. The counter-weight that provides lift for this massive gate was damaged and fell on top of this closed gate. A crane or dragline is needed to lift this sizable concrete weight off the gate, and the broken attachment mechanism repaired.

- There is probably more land now under cultivation than in the history of the Boghra canal system. Through the years the farmers and some more recent settlers along the Boghra canal illegally tapped into the main canal with pumps and pipes bringing more "out-of-project areas" under cultivation. During the winter of 1998-99, the Taliban stopped the pumping and removed the pipe taps but there remains some illegal use of water directly from the Boghra reducing the amount of available water for the original system.

Recommendation: *A repeat of the 1993 DAI /ESC satellite assessment of land use in Helmand would be very useful for planners.*

- The miss-use or over-use of water by central Helmand farmers has always been a problem. There are no water charges and once the water leaves the main canals, it is in the hands of the local water users groups. The *mirab* himself is normally a farmer on the same ditch he controls. And as virtually every consultants' reports since 1946 have observed about farmers' attitudes towards water use: "If a little water is good, more is better."
- As mentioned, water shortages for irrigation in the project areas have been noted at least since 1970. Part of this shortage likely relates to the increase in double cropping through the years and perhaps to the increase in cotton production. As agriculture specialists always point out, a cotton crop takes more water than some of the other crops, like wheat. The growing season for cotton, if planted for maximum production is longer, from March to November and this includes the hot season when evaporation rates are highest. By May temperatures climb up to 110 degrees. And two crops a year, double-cropping, take more water than one crop, especially if the one crop is the traditional winter wheat which remains dormant for several of its growing season months. But two crops a year increase agriculture production and farmer incomes.

Parts of central Helmand are water short and the farmers' answer for this problem is the use of drain water. Will the use of drain water be detrimental to the crops of central Helmand?

I took water samples on 8 Jan 03 from Deep Drains #1 and #2 at the points where they leave the agricultural areas of Nad-i-Ali and become wasteways. I had the water tested by the Soil, Water and Plant Testing Laboratory at Colorado State University, a university with a focus on irrigation. The detailed findings of the laboratory are an attachment to this report but the conclusion was:

"This water is classified as medium salinity hazard irrigation water. It should not cause problems due to salt accumulation in the soil if a moderate amount of leaching occurs and soil drainage is adequate."

This conclusion emphasizes the importance of our present drainage system rehabilitation activities. It also alerts us to the potential problem associated with the use of drain water in undeveloped "out-of-project" areas that do not have the benefit of even a silted-up drainage system, and undeveloped and marginal "in-project" areas being farmed with no or inadequate drainage. Two such areas will be discussed below.

***Recommendation:** A project agronomist and ag. engineer should begin visiting and surveying the large out-of-project areas and the marginal in-project areas to identify and prioritize problem areas and make recommendations for action. In some out-of-project areas, I have noted some ineffective attempts at shallow on-farm drain excavation but the resulting problem is commonly the lack of an outlet drain....Drain to where?*

Wells and Irrigation: Another answer to the water shortage is wells, either drilled or hand dug. Many of the larger, richer residential compounds in Central Helmand have drilled wells for household use and some for kitchen gardens. These wells are for convenience and privacy. Local contractors drill the wells with percussion drills. I have not seen a rotary drill in the region since the war. All of the wells I have seen in Nad-i-Ali are drilled wells and tend to be some 20 to 30 meters deep. As this area is up on the desert escarpment the water tends to be deeper than along the flood plain of Shamalan.

***Recommendation:** Survey the local well drilling contractors for more details on well depths, water quality and well distribution. I have suggested to CADG to expand their survey work to include well numbers, use, distribution and type.*

DACCAR (Danish Aid Committee for Afghan Refugees) and other NGOs have been installing drinking water wells in the region for some years. Usually such wells are located outside private compounds for neighborhood use and have hand pumps set in a concrete slab base. There appears to be some problem with finding replacement parts for these hand pumps. But drinking water for most compounds still appears to be hauled from the nearest canal or drain in yellow, one-gallon plastic oil cans. The traditional orientation is that running water (canals, drains, rivers and streams) is pure water. An informal survey in the 1970s among households in the north Shamalan indicated that this running water was preferred over well water.

Drilled wells are common in the out-of-project areas to the north and west of Nad-i-Ali along the desert side of Boghra canal. Before the Taliban prohibited such use, these areas used pumped water from the Boghra canal. Now the wells apparently tap the nearby Boghra canal seepage. Drainage in these areas is minimal or non-existent. Most of the people have settled in these areas since the war, and some appear to be settled nomadic sheepherders who may have lost herds to the drought.

In the flood plain settlements of Shamalan or Nawa, especially in the more water short lower reaches away from the river, there is dependence on hand dug wells for irrigation water. These wells tend to be 6-8 meters deep and are commonly pumped by portable Chinese-made diesel pumps or by pumps attached to tractors. The water source is from a gravel layer with an adequate flow from the river.

Since the war, there has been a movement of some farmers out of the fertile flood plain of Shamalan up onto the nearby desert escarpment, bringing more land under cultivation. Many of these larger compounds, of the larger landowners, have drilled their own wells for water for household use. In some cases irrigated kitchen gardens occupy the previously desert steppe.

Tile drains: As noted, the purpose of this project is to rehabilitate the drainage system of the central Helmand Irrigation system, beginning in Nad-i-Ali. This drainage system includes sub-surface tile drains put in by Morrison-Knutsen Afghanistan (MKA) in the 1940s and 1950s as the Nad-i-Ali area was being developed. These "tile drains" are made of 8" to 10" concrete pipe sections about 1 meter long. These tile drains were discussed by USAID in the 1970s Drainage Project period. Consideration was given to putting in the more modern version of buried drains of continuous perforated plastic pipe. A machine, in one pass, puts down this more modern version of drain across the field. The idea was rejected by the project because the MKA tile drains were considered ineffective, mostly plugged up and unable to be maintained (cleaned). According to the drainage map of the area, there were 24 of these drains in Nad-I-Ali emptying into Deep Drain 1 (DD1), 2 outlets every kilometer. We checked these drains and improved and repaired the outlets where needed during this contract period. Some 67 meters of drain pipe were installed in the process.

Of the 24 original tile drains, 20 are still functioning. It is not clear why the 4 drains became inoperable but they are all located in the same area: the last 4 drains before DD1 becomes Nad-i-Ali Wasteway crossing the desert to the Helmand River. This is also the area where farmers during the *mujahideen* period (1988-96) were said to have blocked DD1 in an attempt to divert the drain water into fields for irrigation. There were no clear statements from the farmers on the success or failure of this action but the raised water level in DD1 could have blocked the tile drains in the area.

The water from these tile drains is used by many of the farm families as a drinking water source. They apparently considered the water purer than the regular drain water, probably a correct assessment. The areas around many of these outlets have been excavated out providing a spot where the water cans can be easily filled, men can wash for prayers and some of the younger men bathe in the evenings.

Recommendation: *There will be drainage specialists among the ag. engineers visiting the area as this project progresses. They should examine the 50-year old tile drains still functioning in the area, re-assess the effectiveness of the original spacing of these drains and reconsider the use of buried drains for any future land development in central Helmand. Buried drains would provide more agricultural land.*

The present spacing of one tile drain per kilometer, given the tight clay based soils of Nad-i-Ali, would not appear to be adequate. At one point in the mid-1970s, technicians from the U.S. Soil Conservation Service suggested one on-farm drain every 50 meters. The tile drains are placed diagonally across the fields while the surface drains are placed vertically.

Conglomerate: As noted in virtually all soils and drainage reports since 1946 on the Helmand irrigation development, some 2 meters below the surface of much of Nad-i-Ali and some of Marja there is an impermeable, natural conglomerate layer, with a density about the same as poured concrete. This results in a natural problem for drainage in the area when combined with farmer over-use of water and a clogged drainage system. Waterlogging and salinization can and does occur easily. I have never seen a soils map documenting the distribution of this formation.

Recommendation: *Search for soils maps documenting the distribution of this layer in USAID/HVA/SCS/US Bureau of Reclamation archives. If not found, over time, systematically survey and map the formation's distribution and depth. This would be useful for drainage planning purposes.*

We encountered this concrete-like layer in the manual cleaning of Drain 1-C on 26 Nov 02 at 5 feet 6 inches below the surface and in several other locations. To improve drainage, it would be useful to crack this impermeable layer wherever encountered. Given the tools in use, picks and shovels, the hardness and thickness of the layer, perhaps 4 to 6 inches, we did not deepen this drain beyond its original level.

At the intersection of Drain 1-A (D.1-A) and Deep Drain 1 (DD1) and below, we again encountered the conglomerate layer. When DD1 was in full flood from drainage, water backed up into D.1-A. This was after we had cleaned both drains. And the bottom of DD1 was the conglomerate layer. D.1-A has clearly been deepened over the years.

Bridges: There are 6 concrete bridges built for vehicle traffic to cross Deep Drain 1 along 14 km of earth-surfaced service road in the inhabited district of Nad-i-Ali. These serve the hundreds of trucks, cars and tractors that traverse this district daily. In addition, farmers developed at least two fords where tractors cross. These fords suggest a potential need for additional vehicle bridges in the area.

***Recommendation:** Beginning in Nad-i-Ali, re-evaluate the traffic flow of vehicles and tractors through the area and the use of existing bridges. Are more vehicle bridges needed? Discuss this issue with local leaders and vehicle owners. If more bridges are needed, discuss local participation in this construction with the local communities.*

In the process of cleaning DD1 we removed the 5-6 small, crude footbridges built by farmers to serve pedestrians and animals. Since these footbridges represent the modern traffic flow that has developed through the area over the more than half century of Nad-i-Ali's existence, the farmers will likely replace the bridges we removed. One of the problems with these bridges is that in some cases they constrict the flow of the drain water. We left one bridge intact near Drain 1-A at the lower end of DD 1 because it was relatively well constructed, did not reduce the flow of the drain water, and it served the children on one side of the drain to attend school on the other side. The residents and the mullah in this area offered to work with us and help fund the construction of a more functional and safer footbridge. I had our local engineers, both DAI and HAFO, thinking about and working on a design that could be quick, cheap and functional but funding was the delay. The idea was not pressed because of the limited amount of and focus of project funding.

***Recommendation:** Have the project engineers design a cheap and functional footbridge that can be easily adaptable on most Deep Drains in the region. Perhaps I-beams and wood. I-beams from Pakistan are inexpensive and readily available in the Lashkar Gah bazaar. The average span for these bridges across main drains would be 13 to 17 meters, depending on how near the top of the drain the bridge would be located.*

Individual Tractor Crossings: Beginning in 1946 with the construction of the Central Helmand irrigation system, there were virtually no tractors in the Helmand region. The government had tractor demonstration farms in the early 1960s and HVA offered tractors for sale on credit. By 1965 some 13 farmers bought tractors under this program. But the irrigation system was not built for mechanized farming. Settlement plots of land were relatively small and there were few bridges built for the movement of tractors through the system. People plowed with oxen. Two developments over the past 20 years compound the problem of tractor movement:

- The original settlement pattern was for the farmers to live in consolidated villages (in Nad-i-Ali) with daily movement to the fields. This reflected the traditional settlement patterns in much of the peasant-based rural world and based on the need for security. A grid of irrigation ditches and drains demarked the original farm blocks. But in recent times the farmers have been building housing compounds and moving onto their land holdings.

- In this area of reasonable sized land holdings and the wealth brought in by poppy cultivation, hundreds of these farmers have purchased tractors. To move their tractors across the network of ditches and drains, the farmers have built crude bridges and culverts, many out of sticks and rocks. Most of these structures constrict the flow of water through the system.

During the drain cleaning process, we removed many of the offending structures and replaced them usually with 3 one-meter concrete pipes, 50 cm. in diameter. These pipes are produced in private concrete molding shops in Lashkar Gah. The project bought the pipes at about \$2.50 a pipe and the farmers picked them up with their tractors and installed them. We faced some problems of broken pipes in shipment and proper placement of the pipes in the ditches (grade) but generally the system worked well and provided positive public relations with the farmers. Given the long distance traveled for pipe delivery, the farmer contribution was sizable.

EXISTING CASH CROPS

Peanuts and Cotton: Peanuts are one of the most rapidly developing cash crops produced in central Helmand, in direct competition with cotton and a very good alternative crop for opium poppy. Before the Soviet invasion, cotton was the most important cash crop in the region and growing rapidly. The increase in cotton production was so rapid in the mid-1970s when the government began to pay good prices to the farmers that the British constructed a second cotton gin. It was completed in 1979 just as the war cut the markets. We leveled it with bombs in 2001.

The 1965 Tarzi-Stevens farm economic survey of Helmand makes not mention of peanuts. In the 1970 Owens farm economic survey, peanuts are combined with melons, other nuts, and sometimes vegetables in the statistics thus making it difficult to estimate the importance of the peanut crop. The percentage of land in these crops is 4.7% in Nad-i-Ali and 3% in Marja; the only two areas in central Helmand said to produce peanuts. Production figures (which are given) are low for peanuts: 22.5 *mon* per *jerib* for Nad-i-Ali and 17.6 *mon* per *jerib* for Marja, as compared to up to 200 *mon* per *jerib* today. Peanuts are not mentioned in the 1975 farm economic survey of Helmand. (1 *mon*=4.416 kgs.=9.736 pounds. 1 *jerib*=.1936 hectares=.4784 acres)

During the spring planting season of 1999, peanut production was centered on and somewhat limited to the Nakilabad area of north Nad-i-Ali between Chah-i-Anjir and "Shovel" Siphon (Station 39+830 on the Boghra Canal). This past crop season, peanuts were being planted throughout most of central Helmand but with the greatest concentration still in Nad-i-Ali. I estimate that in the fall harvest season of 2002 as much as 25% of the land in this district was planted in peanuts. The market price remained high even during harvest season, around 100,000 Afs per *mon*. (45 to 50,000 Afs = US \$1). Peanuts and cotton (the long

term traditional cash crop) appeared to be equal in importance during this crop season. I think that many more peanuts will be (are being) planted this spring than cotton given the prices and experience with cotton this past harvest time. One can make more money with peanuts: the bottom line for farmers.

The primary peanut markets appear to be in Pakistan and Iran with some of the production going to the larger cities in Afghanistan. In 1999, the buyers from Herat (Iranian market) and Ghazni (Pakistan Market) were mostly going direct to the farmers in Nakilabad for their peanuts. By fall of 2002, there were some 10 to 15 peanut wholesalers in the Lashkar Gah wholesale bean bazaar, making large and multiple sales per buyer per season. The fall sale season of 2001 was a disappointment to all. Because of the war and the uncertainties along the borders, the past buyers did not come and wholesalers still had peanuts into the spring of 2002. But beginning March 2002 there was a marked increase in the planting of peanuts due to the uncertainties associated with the Taliban ban on poppy production in 2000, the Taliban's fall from power in Fall 2001 and the delays in payment for the cotton crop.

Given the markets, we may assume that this next year will see an even greater increase in peanut production. Peanut's primary competition as a cash crop is cotton. For greatest production, both crops are planted in the spring beginning in March. Cotton requires fertilizer. Peanuts planted at this time do not. Cotton may produce roughly 100 *mon* per *jerib* and bring 46 to 48,000 Afs per *mon* at the cotton gin. Peanuts produce at least 150 *mon* per *jerib* and bring 80 to 100,000 Afs per *mon* on the market. Peanuts appear to have the advantage in the competition. As noted, opium poppy has had two major government eradication actions during the two past crop seasons. The farmers of central Helmand will be deciding on the alternative cash crop for poppy: either cotton or peanuts. This assumes that the poppy eradication program was as effective as the government officials reported and that the farmers understand that the government is serious in its statements on poppy eradication, and has the political will to carry it through.

Peanuts grow best in slightly loose sandy soils. Most of the topsoil of Nad-i-Ali and Marja are originally tight clay-based desert soils with little organic content, although they have been improving over the past 50 years. Since 1998, I have been observing farmers in this area attempting to change the texture of the field soil by adding tractor loads of sand from nearby desert washes. (See Photo #). According to this farmer in Nakilabad in the process of making this change, presently he gets about 150 *mon* of peanuts per *jerib* from the early spring planting, and some 50-60 *mon* per *jerib* if he plants after wheat is harvested. His neighbor, who added sand to his fields earlier, gets some 200-250 *mon* per *jerib*. And so he is shifting to peanuts.

Recommendation/question: *The early spring planting of either peanuts or cotton does not allow double cropping with fall planted wheat as with the traditional hot*

season crops of melon, vegetables, mung bean and corn. A farmer must skip the fall planting of wheat (or poppy) in order to do a spring planting of peanuts or cotton. Is there a short season winter crop to fill this short gap or is there a productive reason from this skipped season?

Central Asia Development Group (CADG), the primary support organization of the government cotton gin, bought a reported 20 tons of peanuts (not verified) this past harvest season and shipped them to Kandahar for shelling and grading. Recently it returned two tons (not confirmed) of the larger select nuts for sale as seed at a price said to be lower than the average price at harvest time. This should stimulate production and improve quality. CADG is also in the process of importing from India a seed press for making oil.

***Recommendation:** If there is a future DAI Agriculture Project in the region, I suggest that an attempt be made to have someone, perhaps a local businessman, begin processing peanuts in Lashkar Gah. It would have a greater impact on the local economy than having the peanuts shipped out to Kandahar for processing.*

As a side note, for 2-3 years and without success, Haji Mohammad Rahim, an Uzbek of Askari section of Loy Bagh, Nad-i-Ali has been trying to get permission to import a cotton seed press. He is a second-generation settler with land. While he specializes in cotton, he and his brothers are experimenting with early vegetable production. He owns 2-3 of the 10-15 privately owned cotton gins in the area. He can be considered a successful entrepreneur faced with the frustrations of dealing with a non-private enterprise oriented government.

Private Cotton Gins: There are said to be some 15-20 privately owned cotton gins in central Helmand where most of the region's cotton is grown. To some degree, they compete with the government cotton gin in Lashkar Gah. These gins are very small, hand-fed machines and production levels are low compared to the government gin with multiple machines and a more mechanized system. The owners of the small gins pay a slightly higher price to the farmers for the highest quality of cotton. Owners claim their finished cotton is a better product than that produced by the government gin because there are less broken fibers. But they admit that there is a bit more "trash" in their finished cotton. They sell this cotton on the local bazaars in the towns in the region for use in cushions and quilts. The government gin sells mostly to export buyers in large amounts and not on the local markets.

Haji Mohammad Rahim used to sell processed cotton to a weaving factory in the Pakistan tribal areas until the Taliban stopped the unofficial export of cotton. The Taliban also banned the private cotton gin operations but never implemented the ban. The present Karzai government closed all the privately owned cotton gins o/a October 2002. The cotton gin owners make periodic visits to Kabul in an effort to reverse the ban but without success so far.

***Recommendation:** Help formalize an organization of regional cotton gin owners to present a unified front to the Ministry of Small Industry, which should be supporting this sort of business. In a previous discussion, Minister of Finance Abdul Ghani voiced support for the plight of these small gin owners and might be enlisted as a force helping to reverse the ruling.*

Vegetables as a Cash Crop: As late as the 1975 farm economic survey of Helmand, only 2% of the land was in vegetables and with the exception of melons (mostly in Marja and Shamalan) vegetables were primarily grown for home consumption. In the 1970s, there were 2-3 households of Uzbek/Turkmen in Aynak (Shamalan) that produced vegetables for the Lashkar Gah market. This pattern has since changed.

While we do not have a figure for land in vegetables, there is a very active wholesale vegetable bazaar in Lashkar Gah that exports to many regional towns and cities. Some farmers have started using plastic sheeting held up by sticks to produce a greenhouse effect to early plant vegetables beginning in February. This effort has been mostly individual experimentation without technical assistance but generally successful. This "greenhouse" development can be seen in all three central Helmand districts: Nad-i-Ali, Marja and Shamalan.

During April of 2002, early in the season, most of the fruit and vegetables (citrus, cucumber, onion, eggplant and tomato) on the local bazaars were coming from Pakistan, some from Iran, and Farah. But this year, locally produced cucumber and eggplant were on the market in April. The best price goes to the farmer who gets his vegetables on the market first. Last year, one farmer came on the market with eggplant in April and he received almost double the price of eggplant coming on the market in mid-season. He planted early in plastic bags in his protected housing compound and transplanted to his field after the possibility of frost. While he was competing with eggplant from Pakistan, those shipments tend to arrive battered after the hard road trip. He sold directly to the shops in Bolan (Shamalan) bazaar, some 300 meters from his field. Related to this problem of shipping, several of the farmers stated a preference for Roma tomatoes over the larger varieties because they are small, hard and ship well even when ripe.

In Shamalan, perhaps 25-30% of the land was in okra and tomato during the hot season of 2002. While Nad-i-Ali tends to be the center of peanut production, Shamalan, which is nearer to the Lashkar Gah market, and the villages of the Central District around Lashkar Gah appear to have the lead in vegetable production. Melons, a long established cash crop, are produced throughout the central region.

Many farmers have started growing their own vegetable seed. Onion seed, for example, was being produced in all three central Helmand districts and the

farmers discuss the seed by name. "Grano" onion, for example, was discussed by size (it is a big onion) and limited shelf life.

In summary, as opium poppy is being eliminated as dominant cash crop, the interest in vegetable production among central Helmand farmers is growing rapidly. Helmand farmers are generally smart, double cropping farmers benefiting from a cash economy. Many are experimenting with these new cash crops and they are learning rapidly. But the marketing of their produce clearly worries them: some sell direct to local markets; some sell to the wholesale market in mid-season when the prices are low. They need technical help in producing earlier crops and help with marketing, storage and shipping. They need organizational help.

The central Helmand region is wealthy compared to some other areas of the country. The seasons and the altitude allow double cropping. The Helmand River provides a good source of irrigation water. There is a good local market for fruits and vegetables. They have a cash economy. Even the smallest bazaars in the region have a good selection of fruits and vegetables either locally produced or imported from other provinces, Pakistan or Iran. They have 2-3 varieties of citrus, pears, apples, grapes, pomegranates, plums, squash, greens, eggplant, okra, tomatoes, cucumbers, carrots, cauliflower, onions, beans, spinach, radishes, turnips, and potatoes. They have several varieties of melons and watermelons that have long been a cash export crop for the region. I have not noticed lettuce, celery, broccoli, asparagus or cabbage on the market but one farmer made a request for broccoli and asparagus. Cabbage was grown in the area in the 1970s.

The farmers recognize vegetables as a viable cash crop but as noted, they are less sure of the markets for mass produced crops. There have been some bad experiences over the past few years with price drops as bumper crops of carrots and cauliflower come to market simultaneously and nothing could be exported.

Recommendation: One of the first agricultural specialists to be brought in should be a marketing expert. While CADG is involved in the international marketing of items like cotton and raisins, they have not been involved in identifying markets for vegetables. As a side note, one of the justifications for the construction of Kandahar airport was for the exportation of agricultural produce from the Helmand and Kandahar region to the Gulf States. Lashkar Gah also has a smaller unpaved airport that can accommodate a loaded C-130 aircraft.

LAND DEVELOPMENT

There are many areas in central Helmand that would benefit from improved drainage. Some of these areas have come under cultivation since the development of the irrigation system and are considered "out-of-project" areas.

Some of these areas are within the original project boundaries but somehow remained under-developed. I will discuss here only two such examples in Nad-i-Ali but there are many other similar areas that need help.

- **Area Near Boghra Canal Station 47:** This is the irrigation turnout that serves the area in question. (See Map #) It is said to be an area of some 960 jeribs (460 acres) and 57 families. It is bound by the Boghra canal, Deep Drain #1 and Drain 1-U Spur 1. The still functioning Tile Drain 12 runs diagonally across the area. We named the primary surface drain through the area "Drain 1-U Spur 2" but this drain does not appear on the drainage map nor was it built at the time of Nad-i-Ali development. This drain was developed by the farmers, appears to follow irregular field boundaries and the alignment shown on the map does not reflect reality on the ground. There are numerous on-farm drains emptying into this drain. The present Drainage Project cleaned this drain and expanded it somewhat but did not touch the alignment. While this drain does not serve the drainage needs of this land area well, it is better than nothing. There is a waterlogged and salted area (marked on the map in red) near the Boghra canal that is not in use but could be brought into production.

***Recommendation:** Working with the mirab and the farmers, survey the area, plan and put in an effective drainage system. The farmers would willingly participate in the development of a good drainage system.*

- **Area South of Drain 1-A:** This is a mostly undeveloped land area of some 4 square kilometers bound by Drain 1-A, Deep Drain #1(DD 1) and the road running south from Khoshal Kale through the village of Sayedabad, in the southwest corner of Nad-i-Ali. (See Map#) Perhaps 5% of this land area is under cultivation and irrigated by pumps from Deep Drain #1. During the time we were cleaning DD 1 and Drain 1-A, a delegation of Hazara farmers from the area asked for help in developing drainage and irrigation for the area. We told them that at this time our funding was for cleaning the drainage system and not land development. It is clear that farmer participation in any work on this land would be forthcoming.

There are 5 ditches of varying sizes that have been excavated some ½ to 1 kilometer into the area from DD1. The work appears to have been engineered but the ditches are not evenly spaced as if part of a drainage plan. And they do not appear to be the result of a farmers' initiative. Only Ditch "a" appears to be in use as an irrigation ditch and it is smaller than the others. Local stories vary as to the age and original use of the ditches through time, some dating back to the original development period for Nad-i-Ali. Another story relates to the period between the end of the Soviet occupation and the rise of the Taliban. Apparently some individuals blocked DD1 to the point where the water could be gravity fed through

these ditches to irrigate some of the land. The land does not have the appearance of desert steppe but of land that has been cultivated at some time. In any case, these ditches are not in use presently and could be re-excavated for use as drains, assuming there is a water source. The farmer delegation indicated that they would use drain water.

Generally the widths of the ditches are some 5 meters at the top and 3 meters at the bottom with embankments of some ½ to 1 meter high. Depths of the ditches vary greatly.

***Recommendation:** In collaboration with the local mirab, the farmers, Land Records and HVA, attempt to identify the ownership of the land in question. Identify the potential water source for this land. Plan the layout for an effective irrigation and drainage system for this sizable area taking the drainage ditches to the Sayedabad road. This will be a sizable and complicated task but with the potential of bringing a large area of new land into cultivation*

OTHER REPAIR AND CONSTRUCTION SITES

Roads: Except for the Kandahar to Herat highway, all the roads in Helmand province are unpaved. Given the limited rain fall (Lashkar Gah averages about 4 inches a year in good years) unpaved roads are not a problem if periodically maintained. Maintenance did not occur in the more than 20 years of war thus the roads are in poor condition. The two main routes to the main highway are the old MKA gravel roads from Lashkar Gah to the highway if you are going to Kandahar, and from Lashkar Gah to Chah-i-Anjir to the Boghra Canal and on to Girishk if you are going to Herat. There are several desert short cuts associated with these roads that should be studied for improvement and up grading. But for the present movement of goods and produce into and out of central Helmand, and to reduce wear and tear on all vehicles, these two main roads require repair: grading, graveling, compaction. This involves some 120 km. of road.

All of the main farm roads in the area, Nad-i-Ali, Marja, Shamalan and Darwishan, much of it along the canal and drain service roads, also need repair and grading for the movement of produce out of the area. This involves some 500 to 1000 km to start. These are not costly repairs but badly needed repairs. And with the right approach, the farmers, especially those with tractors, can contribute to this rehabilitation.

The Shamalan Canal: The UN recently (2002) funded two studies of repairs needed on the Shamalan canal. ("Shamalan Canal Socio-Economic Study" 10/25/02 and "Survey Report of Shamalan Helmand Province Lashkargah (sic)" 6/8/02, by Afghans for Civil Society). This canal is a major branch of the Boghra Canal and runs parallel with the Helmand River. In some places it runs dangerously near the Helmand River and to date has been cut in two locations,

near Station 13. Several other areas are also endangered, one of which I will note here. This site is not mentioned in the UN reports.

This site is some 4 km from Lashkar Gah bridge downstream (south) what I will refer to as the Russian Shamalan Branch Canal (RSBC) (See Maps #). This is a feeder intake canal built at the time of the Soviet occupation or a bit later when the main Shamalan canal was cut by Helmand River flooding. The intake off the Helmand River is some 400m upstream from the Lashkar Gah bridge.

At roughly Station 21+350 on the Shamalan canal, a branch of the Helmand River turns in the direction of the canal and comes within 50-100 m of the RSBC. A dry seasonal channel (during mid-winter dry season) connects the river with the RSBC. In early January 2003 the dry channel bottom was roughly 2 m higher than the water level in the river. The Helmand River in flood would pass through this channel and put quantities of water into the RSBC and lower into the main Shamalan canal exerting pressure on the total system and structures, depending on the level of flood. A major flood equal to that of 7 February 1999 would cause damage to the system. This flood endangered the Lashkar Gah bridge. The Taliban attempted to protect this area with bulldozed embankments of riverbed sand and gravel but these have been breached. According to a *Kuchi* (sheep herding nomad) woman encamped nearby in January 03, no water had passed through the breach channel for the past 3 flood seasons: the drought. But the recent Helmand floods, mid-April 03 likely pushed water into the RSBC putting pressure on the total system further down.

***Recommendation:** A riverbank erosion specialist should study this area, as well as the other similar areas noted in the UN Shamalan report, and design a series of canal protective bunds.*

S-10.7 Lateral: This lateral is a branch off the old Shamalan canal at Station 10.7 and provides water for most of the upper Shamalan flood plain because the old Shamalan canal has been cut at about Station 13 by the Helmand River. Thus, all the water coming down the old Shamalan canal is diverted into the S-10.7 lateral. This lateral was not designed to take this much water. One result has been the water pressure excavation of the channel around the intake structure. (See Photos #). The Boghra Canal was closed down for maintenance on 8 January 03. A local khan pumped the intake area out for us on 11 January so we could photo document the condition. Shah Mohammad did an instrument survey of this eroded area on 12 January with Adam Khan recording.

This lateral has not seen any serious maintenance for about 20 years. Because of silting, its carrying capacity is considerably less than the original design at a time when more water than designed is being pushed through the system. Keep in mind that most of the silting in Helmand canals is from wind blown sand and dirt with the build-up causing shoulders along the edges of the canal rather than water-borne silt being deposited as deltas at the bottom. The extra water through

the system tends to erode out the bottom of the canal in some areas and around the structures in other areas.

As noted, over the past 20 plus years, many of the villagers have relocated their housing to the desert escarpment above the fertile flood plain of Shamalan bringing more of the flood plain area into agriculture use, recognizing and utilizing the real value of this land.

Through most of the area, the S-10.7 lateral follows the bottom of the desert escarpment. Few bridges were built across the lateral at the time of construction because they would have served no purpose. With the shift of housing, the villagers have constructed numerous crude footbridges for access to their fields. Many of these bridges are dangerous and the foundations constrict the flow of water through the lateral. These bridges need to be replaced.

***Recommendation:** In the near future, de-silt the 40 km of the S-10.7 lateral and wasteway drain at the end. Given the size of the channel, this work can be done exclusively by hand labor. Repair and re-enforce the areas around the various water control structures including the very eroded intake structure. Design and build simple, probably I-beam and wood footbridges to replace the cruder structures already built by the villagers. One good, flexible design should fit all needs on this lateral.*

Chah-i-Anjir Suspension Foot bridge: Chah-i-Anjir is a small town of 5,000 to 10,000 people 20-25 km north of Lashkar Gah. It is in the district of Nad-i-Ali and the home of the HCU heavy equipment yard and repair facility. Chah-i-Anjir was the original Morrison-Knutsen Afghanistan (MKA) construction camp for the Boghra Canal before Lashkar Gah was planned and built. It has a small bazaar area of perhaps 50 shops, tractor repair and welding specialists, pharmacies, blacksmiths and carpenters. They have a very busy weekly open bazaar that attracts perhaps another 50 itinerant merchants with an even wider selection of goods. The Basharan wash skirts the town and the weekly bazaar area and must be crossed by any vehicles on the route from Lashkar Gah to Girishk and Heart via the Boghra canal service road. This vehicle crossing is via a paved ford (Irish bridge) put in by MKA in the 1950s. Flash flood waters close this crossing when there is a heavy rain in the desert. There is always some water in this wash, usually about knee deep, from the Nad-i-Ali drainage system. There is a small residential area and 4-5 shops across the wash from the town.

Foot, bicycle and small animal traffic normally crossed the Basharan wash via a well-made suspension footbridge, also by MKA, of some 100 meters that parallels the ford. After years of neglect, in the warm season of 1997 this bridge was repaired via a UN grant. The bridge was taken out by the record level flood of 7 February 1999. This was an important bridge for the community, especially for women and children on foot. But no one has organized the funding or labor to

rebuild bridge. There have been numerous requests by the community for help with this project.

In collaboration with the staff and truck from HCU and at a cost of about \$75, I had this bridge dis-assembled in December 2002 and stored in the HCU equipment yard. The support pilings were also cut at the point where they were bent over. The suspension cables have remained in place. Reconstruction of the bridge would be simple and cheap. The foundations and pipe structure up to the first cross section, about one meter, are all strong, undamaged and in place. All it needs is a small amount of funding and organization. The upper section of the pilings need new pipe, assembly and welding. Some concrete work is needed on the abutments. Then the bridge can be reassembled and made ready for use. Care must be taken to insure that the sag in the suspension bridge is minimal. The excessive sag allowed in the bridge at the time of the UN repair work put it in harm's way. The flood caught the bottom edge of the bridge and took it out after some 50 years of good service.

The cost of rebuilding this bridge would be minimal. The personnel to do the work are in Chah-i-Anjir bazaar or with the HCU equipment yard. The blacksmiths, carpenters, welders, masons and strong backs are all there. And there are no projects in the region that are so visible, so needed and that would be as appreciated by the people as this bridge. The reconstruction of this bridge would be a first rate public relations coup.

***Recommendation:** Take a small amount of project funding from the Drainage Project, perhaps \$1,000, and reconstruct this bridge with the cooperation of HCU, local government and a citizens committee from Chah-i-Anjir. There could be a grand opening ceremony, on a Thursday market day, with the governor's office involvement, a radio broadcast and local festivities.*

Marja Siphon at 73+962: This siphon allows the infrequent desert floodwaters from a wash to pass over the Boghra canal without causing damage. It was damaged by an explosion sometime between 1988 and 1995. The farmers were trying to clear a blockage in the siphon that had already ruptured the Boghra canal wall above the siphon and was flooding the area. They cleared the siphon and repaired the canal wall but damaged some 10 meters of the intake and tunnel. This siphon is important for the Boghra canal and should be repaired. It functions at the present time but if it malfunctions, a large section of Marja would be without irrigation water and a large area would be flooded. The repair would likely require a full winter shut-down work season (40 days) when the canal is closed for maintenance. A skilled and experienced concrete structure engineer with a work plan and skilled work crew would be required at the site at the time of shut down with the required materials and equipment. (See Photos #)

Nad-I-Ali Schools: There are two schools near the Nad-I-Ali Wolis Woli: the old high school that now functions as the boys' school and the old primary school

that now functions as the girls' school. In total, there were said to be some 900 students attending in shifts with an unknown number of teachers. I did not visit the girls' school but it appeared less damaged than the boys' school. The boys' school is in need of major repair. (See Photos #) There are 3 functioning classrooms and an office with the original windows missing and plastered over...dark. There are 4 classrooms with holes in the arched mud brick roofs that need repair. There are 4 rooms in ruins and would require re-building. New windows, some roof repair and some whitewash would do much to enhance the school atmosphere and help return the children from the dark ages of the past 20 years.

MISCELLANEOUS ISSUES

HVA and NGOs Working in the Region: As the Soviets pulled out of Afghanistan, major foreign donors, including the USA, also began to pull back. All of the larger international NGOs faced reduced funding for projects and began to turn operations over to their Afghan employees who in turn, established smaller NGOs. Over time, the number of smaller NGOs increased, both Afghan and foreign. Their funding comes from a wide variety of sources: government, religious, international, private. In Helmand alone there are 15 or 20 NGOs, many with offices, staff and vehicles. In general the technical skills of the staffs are limited. To this biased observer, the impact of the NGOs' activities is minimal for many, if not most. Most NGOs do not bother to coordinate their activities with the government nor with each other. To a great extent, the NGOs ignore the government. This business style may be a hangover from the post-Soviet period when cross border projects functioned independently. The pattern continued thru the era of the Taliban up to the present.

The president of HVA, Eng. Dawari, is attempting to keep himself informed about NGO activities in Helmand by having a monthly meeting for NGOs to report on their activities. I attended two such meetings and the results were limited. This is a simple observation with no obvious solution: while the NGOs are generally staffed with well meaning people of limited skills and little funding, it appears that much of the funding goes to building rent and vehicles purchases. Rents in Lashkar Gah range from \$700 to \$2000 per month and the usual new 4X4 vehicle costs from \$15,000 to \$25,000. Allowing for 1 building and 2 vehicles per 15 organizations adds up to a huge overhead. How to consolidate these organizations, improve the services being funded and put more of the money into productive activity remains a difficult question to solve.

Security: I will not dwell on this subject because security in the region can change quickly in this region with little warning. Presently security for foreigners and project personnel is good as long as they use precautions and common sense. There is a lot of daily traffic moving to and from all the districts in central Helmand. Travel is secure as long as you travel during day light hours on the routes that most people travel.

Our project had a robbery that need not have happened. Two project personnel, a driver and a cashier, took a relatively large sum of money, without the usual accompanying vehicle or guard, to a rural area on the north end of Nad-i-Ali to make salary payments to personnel who had been let go. (We normally make salary payments at the work site.) This was done without informing senior project administrative staff. A man who was not to be paid watched them in this process at the payment site. On their return trip down a rural road, two men unknown to them on a motorcycle flagged them down. They stopped. The men had an AK-47 and robbed them.

One of our field supervisors is a man from an influential family in the area of the robbery. He made some quick enquiries in the area and the robbers were identified by name and kin group within hours of the event. Quick action on the part of the Commandant of Police of Nad-i-Ali tracked the men to Marja and then to Lashkar Gah the following day where they were caught. The robbers' relatives who are local landowners returned all stolen money. There are few secrets in rural central Helmand.

Rural farm cash crop communities are generally honest communities. Insecurity does not fit well with farming. Central Helmand is a stable farming community and a relatively safe place to live and work.

CONCLUSION – THE WEALTH FACTOR

The project accomplished a lot of work in a relatively short period of time. We ran into some blocks that I have outlined and suggested some remedies. Some administrative problems have developed since the end of my contract that I have outlined and suggested some remedies. It is important to solve pending problems before the end of the funding period and not to let them hang. And it is important not to repeat project elements that slowed project progress in the future.

As noted, there is considerable wealth in Helmand not found in many other parts of the country. This is not to be confused with "wealth" by western standards but wealth by Afghan standards. Hard won wealth. The narcotics trade initially generated much of this wealth. But it also relates to the double cropping and cash cropping system that started with the construction of the central Helmand irrigation system, beginning in 1946, and the institutions such as HVA generated with it prior to the opium trade years. The combination of a re-settlement program on sizable plots of newly developed land, supported by a trained extension service backed by a water and soils lab, skilled agriculture technicians and an educational system of rural schools, regional high schools and agricultural schools did much to produce this generation of now aging but intelligent farmers who understand a broader economic agricultural world. The experience for many as refugees in the more developed neighboring countries of Pakistan and Iran

with few restrictions to participating in those economies helped to broaden their worldviews.

The region's wealth is reflected in the liveliness of the local cash economy with an agricultural base. Throughout central Helmand there are literally hundreds of automobiles owned by prosperous farmers. We were caught on several occasions in morning traffic jams of 20 to 30 cars in the small vegetable bazaar of Bolan, on the outskirts of Lashkar Gah as the rural folk came to town. There are 5-6 used car lots in Lashkar Gah. The most common vehicle is the used early 1990s Toyota Corolla from Japan, many still with the Japanese company names painted on the doors. The cars come to the area via the Gulf States and Iran. Those I have seen have more than 100,000 km but are in good physical condition and sell at reasonable prices. All of this was an unknown in the 1970s.

Many of the more successful farmers have their own generators for compound lighting and for electric fans in the hot season. Butane cookers are common. Water pumps are common. Among our hand labor work crews, I noted that several brought thermos bottles of hot tea for lunch rather than the more common metal teapot, loose tea and matches.

There are 3-4 new and used tractor dealers in Lashkar Gah, usually associated with the used car lots. The tractors are mostly Massey-Ferguson from either Pakistan or Iran. The 240s come from Pakistan the 280s come from Iran. New and used gangplows and other tractor pulled implements and blades are readily available from these dealers. If the dealers do not have what's wanted they can order it in a short time from the Pakistan factory. There are a few old Russian-made tractors still in use but most tractors on the road and in the fields are relatively new. There is at least one trailer assembly shop in Lashkar Gah for use with tractors for hauling produce, equipment and people. There are several thousand tractors in this region. Every successful farmer has one. I did not see oxen being used in this region during the fall planting season of 2002. To rent a tractor for plowing or leveling land is cheap and the owners also go to nearby less affluent districts to meet the demand for tractor power plowing.

Gas stations with modern pumps are everywhere and new stations are being built on a regular basis. There are 4-5 stations in Greater Marja, 4-5 in greater Nad-i-Ali and 10-12 in greater Lashkar Gah, and these numbers do not include the primitive stations with 50-gallon drums and hand pumps. There are 3 stations between Lashkar Gah and the main highway with two more at this rather isolated intersection. Can the economy support all these gas stations? The concepts of profit and business success are not the same in this part of the world as in the West. Sol Tax illustrated this concept in his 1950s anthropological classic "Penny Capitalism." People have money and are looking for places to invest. In the 1970s the khans tended to invest in flour mills. I recorded 44 flour mills in operation in Shamalan alone in the mid-1970s. During this contract period, I saw a variation on the big diesel stationary flour mills to which one must haul grain.

The stationary mills are still in place but there are now mobile mills on trucks traveling from village to village to grind wheat and corn. New wheat threshers and flour mills are available for sale in Lashkar Gah bazaar.

This wealth and the people that control it can have a very positive effect on project operations. They are not isolated and backward people. They are innovative people with the assets and the knowledge to experiment with new things but they are not gamblers. They are mostly rural farm people and their real wealth is in their land. They are looking for ways to increase profits from their land with new crops and new farming techniques. They very much appreciate the work on the drains and know the importance of good drainage. They will continue to support the drainage project and make contributions to it if approached in the proper manner. They will participate in any new agricultural programs and crops that they understand and think will increase profits.

I would be happy to discuss any issues, sub-projects or questions associated with this report or the central Helmand region with any interested person or persons.

Appendix 1: CALENDAR OF PROJECT RELATED EVENTS

11 OCT 02: Left Estes Park, Colorado at 0900.

17 OCT 02: Arrived Lashkar Gah at 1200 via Kabul, Ghazni, Kandahar and Girishk.

Boghra Canal Wasteway #1 at 10+917 was open. All the Boghra Canal water was being diverted down the Helmand River. I was told that this was to get water down to the lower reaches of the Helmand River that was badly in need of the water. According to the media (Kabul Times), this was a political move to answer the Iranian charge that the government (from Taliban era to now) had blocked the Helmand River flow, contrary to the Helmand Water Treaty. The Boghra was to remain closed for 3-5 days, not a continuing flow to Iran. With the drought, there is simply not that much water available in the river to serve all the Afghan irrigation intakes (Boghra being the biggest) and get the water treaty quota to Iran.

18 OCT 02: Began search for project housing.

19 OCT 02: Met with Eng. Dawari, Helmand Valley Authority (HVA) President, and discussed the project plans and limitations. I had discussed the potential DAI Helmand Irrigation Project with him before my departure from the area in May 2002. He pledged complete cooperation. Visited Watermaster Obaydullah of Nad-i-Ali. Discussed present wage rates for farm labor with him and others and concluded that 90,000 Afs (US\$1.68) per day for labor and 100,000 Afs per day for supervisors were acceptable. Visited the junction of Drain 1-Q and Deep Drain #1. Requested Obaydullah on the morning of 21 October to mobilize 100 men. In 1999 area farmers had requested Drain 1-Q for work. I visited this site on several occasions through the years and discussed the work with Mohammad Karim, now deceased, then chief watermaster of Nad-I-Ali.

20 OCT 02: Met with deputy governor, Pir Mahmat (the governor was away) and discussed project plans and limitations. He proposed an opening ceremony at the start-up work site and complete cooperation. The potential DAI Helmand Irrigation Project had been discussed with the governor and his staff in May of 2002. A news announcement was made on Lashkar Gah radio about the start of the drainage project.

We purchased 100 shovels with handles installed @ US\$1.68 each, and 10 picks.

21 OCT 02: With 100 men work started on Drain 1-Q. The opening ceremony was held across from the work site at the compound of Surrat Khan, a local notable. It was attended by 25-30 people from the government offices, HVA and local tribal notables including: Governor's Secretary Mayudin (the "power behind

the throne”), Nad-i-Ali *Wolis Wol* and Commandant, Eng. Dawari (President of HVA), Obaidullah (Head of Irrigation Dept.), Haji Safar (Kharoti tribal leader) and other khans of the area. The opening ceremony was covered by Lashkar Gah radio. Surrat Khan provided the project a field office compound where equipment could be stored and supervisory staff lunched and had meetings.

Located and recruited surveyor Shah Mohammad in Nad-i-Ali. He starts surveying Deep Drain #1 tomorrow with his own, but rather dated equipment.

Sign painter starts on “USAID” signage.

23 OCT 02: Met with Mr. Farouq, Head of HCU at 0930 about leasing draglines for work on Deep Drain #1. We made a tentative oral agreement on cost. The dragline was at the work site by 1630, to start work tomorrow. The *Wolis Wol* and Haji Safar were invited to attend dragline start up.

From the start of the project, the DAI policy has been to engage all farmers along the drains being cleaned in a dialogue about poppy cultivation: that the project (US funding) will stop if poppies appear, as happened in 1999.

25 OCT 02: Provided telephone interview with Voice of America (VOA) Pashto Service on project start up. Program broadcasted in region the following day.

2 NOV 02: First kilometer of Deep Drain #1 cleaned by dragline, averaging 6 cubic meters per linear meter. New rate agreed to with HCU for \$5 per linear meter. Two draglines put to work in tandem, one on each side of Deep Drain #1.

10 NOV 02: Some 4,520 meters of mid-sized drain cleaned in Nad-i-Ali by hand and 2,400 meters of Deep Drain #1 cleaned by machine. There are 300 hand laborers at work.

Due to great fluctuations in value the Afghani on the local market, with the announced coming of the new currency, the laborers requested that they be paid in Pakistan Rupees. This will be started in next pay period.

17 NOV 02: Elisabeth Kvitashvili (USAID), Bev Eighmy (INL) along with a planeload of embassy personnel visited the project site; a joint visit to the Drainage Project and the Cotton Project. Haji Safar met the party at the edge of the project area, assuring all that poppies would not be planted in the context of the drainage project. He presented Elisabeth with a letter signed by 8-10 khans and farmers re-stating this position.

Bev Eighmy was unaware of the proposed DAI Helmand Irrigation Project, showed great interest and hinted at the possibility of a joint USAID-INL funding.

21 NOV 02: Met with Mr. Farouq of HCU about starting dragline work in Marja on Outlet Drain C at the point where the Taliban work had stopped.

22 NOV 02: The HCU dragline was delivered to the work site and started to work.

25 NOV 02: Some 15,560m of mid-size drain cleaned in Nad-i-Ali by hand and 5,200m of Deep Drain #1 cleaned by machine. There are 440 hand laborers at work.

29 NOV 02: Met with Paula Lloyd of US Army Civil Affairs section (rank unknown) at Kandahar Airport and discussed projects. Apparently the U.S. Army is drilling some water wells and working on some schools but it was not clear to me where. They were thinking of repairing the girls' school at Lashkar Gah but were unaware of similar plans by USAID. They had no funds for buying office or heavy equipment or spare parts.

1 DEC 02: To Peshawar via Kabul and Islamabad for discussions with Eng. Jawed of HAFO about new revision of proposed project budget. Work stopped for *Eid* holidays o/a 3 DEC 02.

12 DEC 02: Hand labor work re-started by Habibullah (Office Manager) with pre-arranged telephoned start signal from Peshawar.

19 DEC 02: Returned to Lashkar Gah via Kabul (for meetings) after several days of weather delays in Islamabad.

Violence occurred between one project work party and men looking for work near Khushal Kala. We continue to have many men asking for work on a daily basis. The tension and pressure in the area continued to grow in the demand for more work. This was the season when a very large work force normally is at work thinning and weeding the poppy crop - but not this year. A local blacksmith complained that the sale of the standard poppy weeding tool was off. The poppies that were planted were planted late. The farmers were waiting to see what the government policy was to be. Because of the slow movement of funds we were keeping the work force at about 400 men. Politically we cannot afford to delay salary payments to this economically marginal group of men.

21 DEC 02: HAFO cashier robbed on road of Rs 192,330 (US \$3,374) in Nad-i-Ali after making some payments to laid-off laborers. The thieves were quickly identified by name and kinship and pursued to Marja and Lashkar Gah by Nad-i-Ali assistant commandant.

22 DEC 02: Thieves caught in Lashkar Gah. All stolen funds returned by relatives (local landowners) of thieves by 2 JAN 03.

Some 31,724m of mid-size drain have been cleaned by hand in Nad-i-Ali and 9,200m of main drain have been cleaned by machine in Nad-i-Ali and Marja. Now 500 hand laborers are at work.

23 DEC 02: Light rain during night.

26 DEC 02: Light rain during night.

30 DEC 02: 100 – 200 men appear at work site demanding work. Clearly an organized affair. Nad-i-Ali commandant called in. No violence.

Some 43,073m of mid-size drain have been cleaned by hand in Nad-i-Ali and 11,000m of main drain have been cleaned by machine in Nad-i-Ali and Marja. 525 hand laborers are at work.

31 Dec 02: 100-150 men appear at work site demanding work. Nad-i-Ali commandant called in. No violence. Meeting called with *Wolis Wol* and village elders for tomorrow to discuss work situation.

1 JAN 03: Immediately stopped dragline work on Deep Drain #1 after seeing farmers weeding/thinning poppy field near work site. Meeting with *Wolis Wol* and elders gave opportunity to stress the relationship between development work and poppy cultivation. Poppy farmer jailed during meeting. Agreement with elders that some workers would be hired from the villages in the areas where the project was working but this meant that some other workers would have to be let go. Given continued limited funding levels, our work force would remain at about 525 men.

4 JAN 03: Using bullhorns, poppy eradication teams begin work in Nad-i-Ali announcing in villages that poppy fields are to be plowed.

5 JAN 03: Caught in traffic jam of 6 – 8 vehicles of poppy eradication teams at the normally quiet crossroads of Askari village in Nad-i-Ali. Vehicles were 4-door pickup trucks loaded with scruffy young men carrying rocket launchers and AK-47s, followed by tractors with plows.

6 JAN 03: Deputy Commandant of Nad-i-Ali stopped us on the road to show us a list of farmers whose poppy fields had been plowed under as part of eradication effort. He said it was more than 200 *jeribs* so far. He had 4 tractors following him, and he was excited about the work he had accomplished. (1 *jerib* = .1936 hectares = .4784 acres.)

7 JAN 03: Boghra Canal closed for annual maintenance.

8 JAN 03: Water sample collected from Deep Drains #1 & 2. Water still flowing.

9 JAN 03: Second dragline moved to Marja to begin work tomorrow on Outlet Drain D.

10 JAN 03: Some 59,078m of mid-size drain cleaned by hand in Nad-i-Ali and 12,049m of main drain cleaned by machine (with frequent breakdowns) in Nad-i-Ali and Marja. There are 525 hand laborers are at work.

11 JAN 03: Local Khan pumped out water (at no cost to project) and I photographed eroded S-10.7 intake structure area.

12 JAN 03: Boghra Canal again open. Eng. Dawari indicated that it was to accommodate the farmers whose poppy fields were plowed under. To re-plant wheat or any other crop they require irrigation water. (The Boghra canal was not re-closed for maintenance as no funds available for maintenance work.) Shah Mohammad instrument-surveyed eroded area around S-10.7 intake structure.

18 JAN 03: Good, all night soaking rain with no flooding.

19 JAN 03: Departed for Kabul.

21 JAN 03: Attended meetings again on HAFO budget revision for project.

28 JAN 03 Departed Kabul for Islamabad and Peshawar after delays with Pakistan visa.