UNITED STATES GOVERNMENT

Memorandum

TO : Mr. Owen Cylke, Deputy Director DATE: March 8, 1978

FROM : Bruno Kosheleff, Helmand Project Officer BK

SUBJECT: Helmand Phase II - Economic Consequences to the Project if Farm Drains are not Dug by Hand Labor

You have asked for a brief assessment in economic terms of the consequences for the Project if HCC cannot arrange to dig the farm drains with hand labor as called for in the Project Paper and the Project Agreement. In addition to general comments relating to your request, I wish to proffer a few observations regarding the Project.

BACKGROUND:

The Nathan Report: In 1974 when AID was asked to return to the Helmand Valley to participate in what is essentially a capital construction project, it was decided to incorporate in the Project as much hand labor participation as possible. It is probable that it would have been difficult to sell the project to AID/W had it been designed solely as a heavy equipment operation. Consequently, the decision was made to require hand labor construction of most of the farm and pick up drains. It is obvious from reading the Project Paper that it was clearly recognized at the time that digging 1,260 kilometers of farm drains would call for a formidable organizational task on the part of the contractor. Not only was there at the time little experience in the country in hand construction of farm drains (there is wide experience in hand digging of irrigation channels) but questions arose whether sufficient numbers of workers not only could be recruited but also organized and managed. USAID commissioned a private study (the Nathan Report of May 1976*) to analyze the costs of a labor-intensive versus a capital-intensive approach to digging farm drains. The study explored neither the question of labor availability nor whether a contractor could actually organize a labor force numbering up to 6,000 persons. The study did warn that mobilization and management of such a labor force would be difficult and went so far as to suggest that the probabilities are not negligible that "full reliance on a labor-intensive approach would either handicap attainment of desired (project) targets... or fail to take advantage of

* Robert R. Nathan Associates, Inc. "Farm Drains in the Central Helmand Valley of Afghanistan-Labor-intensive vs. Capital-intensive Construction Alternatives."

the most economical technique for some portion of the construction."* Having made these observations (among others) the report went on to compare machine versus labor costs.

Using then-current market prices (daily wage of Afs. 40/day), cost comparisons favored, for the most part, the use of hand labor. When shadow pricing inputs, however, the comparisons clearly favored hand labor. The Nathan study claimed that no evidence was found to suggest a scarcity of labor; consequently the study assumed that "the cost to the economy of constructing drains with the labor of workers who have no other employment alternatives is close to zero..." At USAID's suggestion (so the Report claims) labor was shadow priced at 50% of the proposed wage. At the same time, again at USAID's suggestion, machine costs - for the imported equipment - were shadow priced at 125% of CIF value. Without going into extended details of the study, it is clear that shadow pricing inputs "can only accentuate the economic advantage... for the labor-intensive approach..." The Nathan study estimated that the short-run income benefits under the labor intensive approach is probably some three times as great as under the machine-intensive approach.

AID Project Paper: The Project Paper appears to have made little use of the Nathan Report, said only in this respect that the report suggests "a labor-intensive approach is more cost effective and in some areas the most technically well suited to the work, at least for the next three or four years." The Project Paper then explains the basis for its own cost analysis, including the cost-benefit analysis. Regarding pricing of the labor force, it shadow prices the labor cost at the market rate of the day, i.e., Afs. 40/day. Labor pricing is not explained in detail but the reader can assume that labor in fact is not shadow priced (or you can say it is shadow priced at market cost) because by 1976 labor was no longer under-employed. Labor by then had several employment options to choose from, i.e,, labor's opportunity cost was clearly rising. The study, however, does shadow price the foreign exchange component of the project. Strong argument can be made that while there might have been a case to shadow price foreign exchange in 1975-1976, by 1978, in view of the general availability of foreign exchange (it carries no premium in the market place), the foreign exchange component of the Project should not be shadow.

* The report suggests - if you must dig the farm drains by hand - that the best method would be to "encourage individual farmers or small groups of farmers to construct needed drains on their own lands and accept per unit reimbursement... rather than to employ a large labor force directly or engage a few large-scale contractors." This recommendation was not incorporated in the Project Paper for reasons that are unclear.

priced in the farm drain cost analysis or cost benefit analysis of the Project.* We can see clearly from the foregoing that the Project costs are going to be higher than were expected at the time the Project Paper was prepared.

FARM DRAIN EXCAVATION COSTS:

What then would be the economic consequences if a machine approach were adopted for the digging of farm and pick-up drains instead of doing the work by hand labor? In the short run, of course, the equity benefits of using laborers would be lost. The escalating costs of the Project, however, would be arrested, at least insofar as labor costs would be a diminished part of total project costs. As the Project is presently structured the U.S.-financed portion of the total cost would go up and the GOA contribution would probably diminish somewhat. This is because 100% of machine procurement costs are borne by AID (no equivalent cost paid by AID under hand labor arrangement). In addition, AID would still reimburse the GOA for 75% of the operating costs associated with machine-dug farm drains.**

Using Project Paper cost projections, the hand labor component of digging farm and pick up drains (at Afs. 40/worker/day) will cost Afs. 113,850,000. At Afs. 50/day, assuming you can get the laborers and organize them, the cost goes to Afs. 142,300,000. Assuming the price of labor for the hypothetical three-year period is at Afs. 60/day, the cost is then Afs. 170,760,000. (Reader should note that the costs as translated to dollars in the Project Paper assumed the exchange rate at Afs. 50=$1. On this point alone, with the appreciation of the local currency, AID reimbursement costs will be higher than were projected at the time the project was prepared). It is not entirely clear from either the Project Paper or the Project Agreement whether the AID reimbursement schedule took into consideration either increased labor costs and/or appreciation of the local currency. The Project Agreement

* The actual calculations done by the economist who prepared the Project Paper are complex; supposedly the methodology used is the so-called Bela Balassa method, unknown to the person writing this memo. Nonetheless, I propose that shadow pricing the foreign exchange distorts the cost analysis in favor of using a labor-intensive method of digging farm drains and is in fact no longer correct.

** Nathan Report says HCC estimated that the import component of total machine costs is approximately 75% of the cost of digging farm drains by machine, presumably depreciating the machinery over a reasonable period of time, i.e., 10-15 years.

(Annex 1, page 12) shows "contingency" under "Reimbursement for Construction" but no explanation is made regarding what contingencies these figures purport to cover. Assuming that the entire amount set aside under contingencies was programmed for increased labor costs, the additional funds would suffice to cover increased labor costs for the life of Phase II (other things remaining the same) if labor rates do not exceed Afs. 55/day.

The Project Paper calls for digging farm and pick-up drains to provide drainage for over 100,000 hectares; this is estimated to require the excavation of 2,700,000 M^3 of earth. We assume that the backhoes that theoretically would be procured to dig the drains would be of two kinds: wheel tractor machine and track-mounted machine, having average capacities of digging 25,000 M^3/year.* Assuming we wish to maintain a three-year schedule (full 12 months operating period), 36 machines would be necessary to excavate the required volume. At an estimated delivered cost, including spares, of $23,000 per machine, AID would have to provide $828,000 for additional equipment procurement. AID would not be called upon to reimburse approximately $2.5 million** (Project Paper calculated $2.1 million) for hand labor excavation. However, AID would have to reimburse around $2.5 million - 75% of machine excavation operating costs - based on the HCC estimate that machine excavation costs come to about Afs. 50/M^3.

CONCLUSIONS:

In summary, four observations can be made and two conclusions might be ventured. First, it should be said that it appears not only improbable, but most likely quite impossible, that Phase II can be carried out within the cost estimates made in 1976, unless of course, procurement costs of new equipment turn out to be much less than foreseen (unlikely) and/or labor or operating costs have been overestimated (highly improbably). It is more likely, then, that Phase II will cost more than planned.

* Machine capacity is assumed to be 29,000 M^3/yr. With maintenance and downtime, actual annual production is assumed at 25,000 M^3.

** Based on labor being paid Afs. 50/M^3. The dollar sum is not verifiable, however, because it is still unclear what excavation rate can be expected of laborers in the Helmand Valley. In addition, the figure is almost certainly on the low side as no one seriously believes the daily labor cost over the life of the Project would remain stable at Afs. 50/day. (The Project Paper assumes that on an average a laborer can dig 0.2M^3/hr. This assumption for the most part is unsupported by data or observation, although it may be correct. Equally, neither have field tests confirmed suitability or rate of excavation of backhoes in actual Helmand operations.)

Secondly, there is some question in the mind of this person regarding what appears to be assumptions contained in the Project Paper - assumptions which are not fully explained and which three or four years later may haunt AID, unless providing more money for this project presents no problem. It is difficult to follow some of the calculations (supporting papers and documents cannot be located) and especially it is very hard to feel confident that some of the figures used are likely to be close to the mark.

Thirdly, an argument can be made to suggest that the premises on which the benefit-cost analysis was made are somewhat questionable. One could conclude that the benefit ratios will probably turn out to be quite a bit lower than calculated.

Lastly, Phase II is already just about one year late (the 1977-78 winter season has passed and few farm drains have been dug). A brief review of the entire project would suggest that the Project Paper is more than a little optimistic regarding how much work can be accomplished in the three-year time frame. It would appear that, say, four or five years from now, we will review progress of the Project and admit we were over-ambitious in the planning stage.* Besides calling for a rather tight construction schedule, the Project Paper requires a great deal from HAVA in the way of organizing farmer education programs, developing water management planning, and numerous other socio-economic activities which call for organization and management skills on the part of HAVA. The skills may not fully exist presently and possibly may be developed only over a lengthy period of time. (As you are aware, there is opinion in the Mission among certain persons with lengthy experience in Afghanistan that HAVA is still far from being adequately organized or staffed to take on its responsibilities regarding Phase II.)

We can conclude two things: One, Given the cost data contained in the Project Paper, on strictly economic terms, machine digging farm and pick-up drains would cost AID an additional $3/4 million, more or less,** while the GOA's contribution would remain essentially the same or diminish slightly.

Notwithstanding the above conclusion, the following second conclusion assumes that some of the costs in the Project Paper are indeed no longer valid when calculated against an exchange rate of $1=Afs. 50. Thus, total project costs - to AID as well as the GOA - might be substantially more than what was foreseen. Unless more funds are programmed, the only other alternative will be to reduce some of the construction activities planned in the Project Paper or procure less equipment and supplies.

* The same criticism and observation was made regarding AID's involvement in the Helmand in the pre-1974 period.

** The Project Agreement (Sec. 3.2) stipulates that cost overruns will be financed by the GOA. Theoretically, therefore, there would be no additional costs to AID.

None of the foregoing suggests we should not go ahead with Phase II. It is merely suggested that we should be prepared to do some re-calculations as time goes by and as we move deeper into the project. We should also prepare ourself to think of Phase II as requiring a longer time frame than three years. One last point should be made: Phase II farm drains represent only some 12% of all farm drains in the GOA Central Helmand Drainage Project Master Plan. It is imperative that we work out a "best method" to the question of how farm drains should be dug. At the same time we should approach the project with open minds and be ready to review the entire question as warranted by experience. There are strong equity arguments for insisting that hand labor dig the farm drains. We must not lose sight of the fact that in the end farm drains are an essential part - probably the most single important part - of the project and must be constructed on a timely basis, whether by machines or by hand labor. Otherwise there will be no increase agricultural output in the Valley and our effort for the most part will have been wasted.

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