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UNIVERSITY OF NORWAY
Noragric
Centre for Environment and
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Second Review of the Um Jawasir Project

by

Fred H. Johnsen and Kjersti Larsen

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Summary

The Um Jawasir project is an irrigation project implemented by ADRA to benefit people from the Hawaweer tribe in Sudan. The pilot phase (phase 0) of the project has been operational since 1991 with 4 pumps. Phase 1 was launched in 1995 with 6 pumps which were larger than the original 4. The project has been reviewed by Noragric in November 1995, and a new review mission was set up in June 1997.

Over the past two years, most of the targets set for the project period have been fulfilled. However, the farms do not yet yield a surplus that can be set aside as a contribution to future expansions of the project.

A women's component is a recent development within the project. The women's activities seem successful and highly appreciated by the beneficiaries, in spite of the limited resources in terms of staffing, funding and land allocation for agricultural activities. The women's own ambitions are in the direction of stronger participation in the agricultural activities within the project.

Monitoring of water resources and soil characteristics including potential salination is satisfactory. Sand movements, particularly invasion of sand dunes, pose a challenge to the project. The impact of a substantial build-up of the stock of small ruminants is uncertain. Continuous monitoring and attention on these aspects is necessary for the ecological sustainability of the project.

The food security and livelihood of the beneficiaries has been substantially improved by the project. Hopefully the agricultural production in the area will be much larger in the future than at present, and that will require better marketing and storage facilities. The major concern on the input side is possible fuel shortages.

The yields in phase 1 of the project are still too low to cover the total of family expenses and agricultural input, including diesel for the irrigation pumps. Consequently, there is not yet any real build-up of the revolving fund. An indicative project budget has been worked out. Estimated farm income (US$ 104,000) less farming costs (US$ 99,000) and family costs/subsistence (US$ 69,000) gives a negative balance of US$ 64,000 for the farming activities. When adding personnel costs (US$ 100,000) and operating costs (US$ 35,000) to this negative balance, it appears that the project needs a support of about US$ 199,000 for 1998 in order to keep activities running at the present scale. The above estimate is a very rough one.

The beneficiaries are being trained in agriculture, and this training seems to work very well. There is, however, no systematic training of managers and leaders among the Hawaweer men and women. Further training would be relevant also for the staff. A farmers' committee has been established, where only men participate. The management capacity of this committee is uncertain.

It is concluded that phase 2 should not be implemented in 1998, but the planning for phase 2 should be initiated. In the opinion of the reviewers, increased budget allocations would be acceptable for strengthening the women's activities, further actions against sand movements, and competence building. In addition to the items mentioned above, it is recommended that measures to increase yields are given priority, that a women's committee should be established, and that the monitoring program should be re-considered. It is recommended that a gender analysis is carried out in 1998, and that next project review/evaluation will be in 1999.

1 Introduction

1.1 Project background

Wadi Al Magaddam is the traditional homeland of two nomadic tribes, of which the larger is the Hawaweer. The Hawaweer depended mainly on camels, sheep and goats, but to a limited extent they also practised crop production in years with good rainfall. During the droughts of the past couple of decades most of the families lost their livestock. It is estimated that about 20,000 families of the Hawaweer tribe have been displaced in the Nile area, while only about 6,000 families remained in the wadi.

During the drought in the 1980s a high malnutrition rate was identified among the nomadic children. In this period, ADRA supplied food aid to the nomads. As relief operations phased out in 1986, ADRA was requested by the government of Sudan to take up rehabilitation among the nomads. It was clear that the nomadic tribes in the Northern Province, such as the Hawaweer, who had been forced away from their ancestral land by drought, suffered the greatest losses. ADRA's assistance to this group continued in the form of health care and small enterprise development.

Searching for a way to develop the home areas of the Hawaweers, ADRA soon focused on the area Um Jawasir. This area has ground water of good quality and sufficient quantity for irrigation, it is situated along a major desert route between Khartoum and the Northern State, the soil fertility is relatively good and the nomads were used to practising rainfed agriculture in this area during years with good rainfall.

1.2 Phase zero of the project

The planning of the first phase of the Um Jawasir project started in 1986. By May 1990 four wells with solar pumps were constructed. The solar technology did unfortunately not succeed, as reported by George (1992 p. 10-11):

" ... Testing of the systems showed that maximum yields of only 45 cubic meters of water per day could be obtained. This was only enough water to irrigate one feddan of land per well. ... problems in the solar pumping equipment arose soon after the installation of the units. One pump developed internal electric problems and could not be started in the mornings. Soon after the electrical inverters of two other units began shutting down during mid day. ... Eventually all of the four sites were experiencing difficulties and working sporadically. The inconsistent delivery of

water by the systems led to the discontinuation of farming and the project site was reduced to a domestic watering hole for animals and the local community."

In 1991 the solar pumps were replaced by diesel pumps. The first commercial crop was produced in the winter season 1992. Since then, the project has produced one winter crop and one summer crop every year. The responsibility of the zero phase of the project has now been turned over to the farmers. That means the farmers themselves have to maintain engines and pumps and pay for diesel and agricultural inputs. Ideally, the four pumps irrigate a total of 80 feddan divided into farms of 2 feddan (0.8 ha) each. At the moment the farming area is less, because about 25% of the phase zero area is covered by sand dunes.

1.3 Phase one of the project

The first proposal for an extended project was formulated in 1992. This proposal went through several revisions and was finally submitted to NORAD in December 1994 and accepted. Phase one involves the construction of 6 wells with pumps having a larger capacity than the original four. A total of 71 farms of 4 feddan (1.6 ha) each and two farms of 2 feddan (0.8 ha) each are irrigated by the project.

The first crop in phase one was cultivated in the winter season 1995/96. The main winter crop is wheat, while the main summer crop is sorghum. Other important crops include alfalfa, okra, beans, and onion. In addition, small quantities of various vegetables are grown for home consumption. Date palms have been planted, and will provide an important crop in the future.

The intention was to implement another three equally large phases in year 1998, 2001 and 2004 respectively. If successful, a revolving fund will finance an increasing share of the investments over time and after phase 4 further expansions should be fully financed by the revolving fund. This was outlined in details during the project review in November 1995.

1.4 Project review in 1995

A project review was made in November 1995 by a team set up by Noragric and a report from the review was issued (Johnsen, Deelstra and Rønningen 1996). The review team found that the project was technically progressing well, and that it contributed positively to land rehabilitation and food security.

In its specific recommendations to the project management the review team from 1995 suggested a monitoring program including ground water level, soil salinity levels, climate data, cropping patterns, irrigation management, fuel and water consumption, and yield estimates. Moreover, it was suggested to establish

windbreaks, to reconsider the recommended distribution of land between crops, to emphasise the build-up of a revolving fund, to work out a marketing strategy, and to work out a strategy for women's involvement in the project.

Moreover, the review team suggested that a future evaluation should particularly focus the following aspects (p. 15):

"1. The build-up of revolving funds from water tariffs up to that time, and the prospects for future build-up.
2. Environmental impacts, including the risk of depleting the water resource, the risk of salination, and the sand movements.
3. Effect of the project on food security.
4. Gender aspects."

1.5 Project review in 1997

The present report presents the observations and assessments made during a project review by Noragric in June 1997. The terms of reference for the team focused on two main aspects. One is project progress and impact, including the gender aspect, the environmental impact and impact on food security. The other main aspect was the sustainability of the project, including economic, ecological, and institutional sustainability. The full terms of reference are presented in appendix 1.

The team's key contacts during the review visit in Sudan were:
H.E. Peters, Director, ADRA Sudan
Fadul Bashir, Project Manager, Um Jawasir Project
Jan Nielsen, Technical Adviser, Um Jawasir Project
Gamal Osman, Farm Manager, Um Jawasir Project
Hafiz Ibrahim, Logistic Manager, Um Jawasir Project
Mohammed Basheir, Field Extensionist, Um Jawasir Project
Manal Hassan , Consultant, ADRA Sudan
El Zeena, Women Extensionist, Um Jawasir Project
Osman Ali Osman, Ass. Field Extensionist, Um Jawasir Project
Khalid Salih, Data Manager, Um Jawasir Project
Alex Thomas, Ass. Data Manager, Um Jawasir Project

The reviewers would like to thank all ADRA's personnel and all the members of the Hawaweer tribe whom we met, for co-operating with us and making a considerable effort to supply us with all relevant information on the project, as well as catering for us during our field trip. The reviewers would also like to thank Mr. Henning Svads, Ms. Sissel Grimstad and ADRA Sudan for very useful comments to draft versions of this report.

2 Overall Project Progress

In the project application from December 1994 four indicators for fulfilment of objectives are specified:

- 6 engines and water pumps installed
- 72 farms, each 4 feddan cultivated
- Data monitoring sufficient to analyse costs of cultivation per unit of crops, changes in ground water level, water consumption, diesel consumption, income per family etc.
- After second or third crop the farmers shall start paying into a revolving fund for expanding the project.

Phase 1 started with 6 water pumps and 72 farms, as specified. The number of farms has recently increased to 73 because one farm has been divided into two in order to adjust to the needs of two old farmers who lack the physical capacity to handle a full 4 feddan farm. This decision was taken by the Farmers Committee which, on the local level, is the main steering body. The objectives of the Um Jawasir Project are economic self-reliance, sustainability and environmental awareness.

The Um Jawasir Project has made availability of food (including fodder) more secure, and, thus, increased livelihood security for the displaced Hawaweer who have joined the project. 6 wells each supporting 12 families are now in function. The livelihood security of the families involved has increased remarkably according to the Hawaweer themselves and project staff.

The involved farmers are trained in basic agricultural skills such as land preparation, planting, irrigation techniques, manure and fertiliser use, and harvesting techniques.

There is a continuos monitoring of basic data concerning climatic factors, environmental factors including soil and water, and economic factors. From these data one gets sufficient information to, over time, gain increased knowledge on the suitable crops for various seasons in relation to climatic and economic factors. This information can be used to adjust and improve procedures and techniques for watering and thus the use of diesel. It is, however, important at this stage to consider whether all the various data collected are necessary for future monitoring of the project and its sustainability.

Each farmer (head of household) pays a certain amount of his agricultural produce into a fund. Economical sustainability of the project is yet to be obtained. Funds are still not sufficient to run the project without external financing. It is, however, too early to expect that revolving funds can be used in order to expand and further develop the project. From this year's crop one expect each farm to pay US $200 into the revolving fund. This indicates that still the funds have to be used to secure

further running of the present project - even this being difficult. However, considering these facts one has to keep in mind the complexity of the project both socially, culturally, climate-wise and that the project has been operating for only a short period. The economic aspects are outlined in more detail in section 6.

3 The Gender Aspect

In the review from 1995 (Johnsen, Deelstra and Rønningen 1996) the gender issue is brought up. The report states that the project "has a strong male bias" (p. 13). At that stage all the employees at the project where men as well as all the farmers included in the project. Furthermore, it was observed that agricultural extension and other activities are exclusively oriented towards men. The review team at that time recommended that "a strategy for women's involvement in the project activities should be worked out" (p. 15).

This situation has now to a certain degree been improved and a Women's Program has been initiated. The Women's program started in June 1996. However, although three women are responsible for the Women's Program only one is properly employed by the project, i.e. a social extensionist. Among the two others one is actually employed by ADRA Karima and is based in Um Jawasir only temporarily and one is a consultant (Agroeconomist) on a part-time basis. The argument for this kind of employment structure is lack of financial means. Given the importance of the Women's Program with regard to the project's sustainability means should be secured in order to extend the number of employees.

Until November 1996, when the centre was established the employees responsible for the Women's Program visited women in their shelters and initiated various training activities in nutrition, health and cooking. Slowly the Women's Programme achieved the confidence of both Hawaweer men and women. At present all training is performed at the Centre: The women coming to the Centre are divided into different groups according to which sub-group of the Hawaweer they belong to. Each group consists of 10- 14 women belonging to different age groups. Despite long walking distances women are coming to the Centre. They come when they have finished their morning responsibilities (preparing breakfast, taking care of the children and shelter, fetching water) and return in order to prepare the evening meal and feed the animals.

The activities introduced to the women are as follows:
*Establishing a women's centre:
*Cooking - how to use recently introduced crops and vegetables.
*Nutrition
*Food manufacturing
*Soap manufacturing
*Sewing
*Agricultural training: land preparation, sowing, harvesting, manufacturing.

In the wake of being together in the Centre and with the employees at the Program, the women also bring up important themes for discussion such as family matters, pregnancies, health and education . Thus indirectly the centre also functions as a discussion and information Centre.

3.1 Women's Programme activities and traditional division of labour/tasks

The Hawaweer society is a sex-segregated and male dominated society. In order to be able to involve women in the project, the women responsible for the women's program approached the male leaders in order for them to approve and encourage the women to participate in the women's program and to come to the established Women's Centre. The first leader to agree was the leader of al Habasab and thus the women from this sub-group slowly accepted the program. Thereafter other sub-groups followed and today women from all sub-groups are involved.

The activities introduced through the Women's program are all new to the women, like the agricultural work introduced to the men through the project. However the activities are related to the sphere traditionally occupied by women, i.e. food preparation and processing, hygiene, child care, health care etc. Moreover, the agricultural training reintroduces women into their traditional role as co-producers with their husbands. Women's traditional role as producers in the household should not be overlooked.

The Women's Program is an important factor in the Project as the main objective of the Program is to involve women in productive work and thus, increases the possibilities for the sustainability of Um Jawasir. However, the Women's Programme is still in the periphery of the project. It seems that the women are not defined as main participants but rather as dependants. This understanding has to be changed towards an attitude where women are approached as main stake holders. The most important element of such a change is to involve women in the main productive activities of the project.

3.2 Women and Agricultural Work

The Women's Program includes training in agricultural work. Yet they are not as the men given land on individual basis. Women's farming activities are not yet included in the project as such. Moreover, women are not perceived as possible farmers.. Considering the fact that most of Africa's farmers actually are women, it is amazing that women were not included in this agricultural project from the beginning, especially because farming activities among the Hawaweer were new both to women and to men.

The fact that Hawaweer women, before the drought that swept away the animals, were actually involved in the household based production system through animal-keeping processing of e.g. various milk products, makes it even more important to involve women in productive work. Following from this the team's contention is that women should be included as farmers and that this is possible given that the process is handled carefully through male leaders and husbands.

As part of the Women's program all the women together have eventually got less than 1 feddan in farm 1 and 4. These farms are called nurseries. The crop harvested from this land is divided between the women and the centre: 50% is given to the centre, stored and used to run the Centre while the remaining 50% is distributed among the women themselves. Each group of women has a leader for agricultural work who handles the distribution of crops between the women of her group. With regard to their present farming activities women say that they prefer to cultivate beans in the winter season because it is demanded in the local market and thus brings cash to the women. For subsistence women prefer to cultivate carrot, okra and rocket salad on the small plots within the women's project.

Otherwise women say that they prefer that their husbands cultivate wheat rather than sorghum. There may be several reasons for such an attitude:
- Wheat has a higher status as food than sorghum.
- The wheat yields last year were higher than the sorghum yields.
- The market price of wheat is higher than the market price of sorghum.

Women's expressed wishes for the future include:
*More farming land
*Possibility to get land in their own name (This is important for women whose husbands are not farmers as well as for divorced and widowed women).
*More regular access to tractor and irrigation. (Now it seems that whenever they need either the tractor or water for irrigation, men's farms are given priority. This is probably due to the fact that women's farming is seen as peripheral. This attitude has to be changed and the project leadership should take responsibility for dealing with this problem.)

3.3 Institutional and management aspects

Are women organised on the basis of traditional women groups?
The Women's program stresses the importance of training and finding leaders in the various activity oriented groups. In the various sub groups of Hawaweer there are two important women positions:
1. The one who knows medicine and performs circumcision
2. One who has authority in terms of age.

Within the Program the employees have approached women with the required faculties and interests who are respected by the other women to take main responsibilities with regard to learning the various activities in order to be able to advice the other women in their groups. This seems to function well and is in line with traditional organisation in the sense that it builds on knowledge and age/respect. Otherwise women are not yet formally organised across sub-groups, nor represented formally in any forums.

Measures to ensure sustainability of the activities

In order to ensure sustainability of the activities introduced within the Women's Program certain women from each group are trained so that they will be able to advice and train other women. Moreover, 50% of the crops grown in the women's nurseries are allocated in order to supply the centre with what is needed in order to continue the activities: materials, flour, vegetables etc., sewing machine, pots and pans. The present Centre is, however, very small. It is only a shelter. A new Centre of more permanent construction is needed.

Gender analysis

A full gender analysis has not yet been undertaken. The baseline study (ADRA/Ministry of Agriculture/Andrews University 1995) differentiates in certain respects the activities and situation of women and men but only in a more descriptive way. Discussing with the employees on the Women's Program and with the Hawaweer women themselves, it is our contention that a gender analysis is needed. In particular because the views, perspectives and proposed solutions on various issues concerning , e.g. division of labour between women and men and woman's wish to engage in and obtain rights in relation to agricultural work. The views expressed by the women themselves partly reveal a lack of understanding of their need among the project staff. However, although the Hawaweer society is a male dominated society this does not mean that women are powerless or passive.

4 Environmental impact and ecological sustainability

4.1 Monitoring of water resources in the aquifer

The total size of the aquifer is estimated at $2*10^{11}$ m^3 (Awasco 1994 p. 15). The annual water consumption by the project is estimated at 1,600,000 m^3 (Nielsen 1996 p. 11). That means the aquifer would theoretically have enough water for 125,000 years.

A more real limitation to the water resources is the potential re-charge, which is estimated at 60,000 m^3 or 75,000 m^3 per day, depending on calculation method (Awasco 1994 p. 15). The estimated water consumption of 1,600,000 m^3 gives about 4,400 m^3 on average per day, which is 6-7% of the re-charge capacity.

The brief estimates above do not at all indicate an alarming situation. Still, it is of the utmost importance that the ground water level is monitored regularly. The review team found that such monitoring is done satisfactory, and data on ground water level were available at the project site. The level of the water table was measured at 27.3m in January 1997 and 26.8m in June 1997. That is, the ground water level had actually increased by 0.5m. Such minor fluctuations of ground water level are normal.

4.2 Potential salination of soils

Soil surveys have been done with short intervals (Awadalla 1996, Awadalla 1997). The survey in 1996 (p. 6) concluded, based on measurement of several soil parameters including pH, $CaCO_3$, texture, total nitrogen (N), available phosphorus (P), exchangeable potassium (K), total soluble salts, and soluble cations specified for Na, Ca, and Mg:

"Salinity or sodicity of the soils are not expected to show up in Um Jawasir farm in due time, because the irrigation water is of low salt content, the underground water level is quite deep which will allow deep percolation of water and leached salts."

The follow up in 1997 (p. 4) "... found that no marked changes in soil salinity or alkalinity had happened. All these parameters improved or started to improve after three growing seasons, ...".

The reviewers find both the level of soil monitoring and the findings in the soil report very satisfactory.

4.3 Sand movements

Invasion of sand dunes is an immediate threat to parts of the old farm area (phase 0). According to a recent estimate by the project management, 8 out of 31 farms in phase 0 are affected and more than 2 feddan were not cropped because of sand dunes during the 1996/97 winter season. A recent report gives an even more dramatic picture of the situation (Land use and desertification control 1997, p.11):

"The pilot farm of an area reaching 96 feddans, involving 48 family farmers, located in heat of the desert, is being challenged by desertification since the protection measures were not adopted during the implementation. In 1995 - six feddans were lost and nine participants were pulled off. This season 3.9 feddan were invaded and the canals were buried with sand. This affected the irrigation system and less water was available for the crops."

The project management has recently made a very good effort to protect the project from sand creeping. An earth embankment has been constructed and Eucalyptus trees have been planted along the Northern border of the project area. This seems to have a good effect, but continuous future attention needs to be given to protecting the project from sand movement and reclaim the area which is presently covered by sand dunes.

Eucalyptus trees perform very well in the project area. When the trees are well established, it would be preferable to establish a more mixed vegetation including ground vegetation and some lower bushes, if possible of local species, in addition to eucalyptus in order to get a more efficient wind break.

4.4 Impact of grazing

A concern has been raised that the livestock could be increased as a result of the project, leading to more grazing and depletion of resources in the wadi outside the project area. On the other hand, the project gives a considerable output of fodder, which should imply that less grazing will be needed.

The group interviews of farmers (appendix 2) reveal that a substantial increase in the number of small ruminants is taking place. The increase is assumed to be partly because of increased access to fodder, and partly due to the recent and apparently very successful introduction of improved dairy goats by the project management. It is also clear that many farmers have some animals at the project site and some animals grazing in the wadi. One farmer mentioned particularly that when the condition of one of his goats in the wadi was poor, he would bring that goat to the project area for some time to feed it properly.

So far, it is difficult to assess whether the project reduces or increases the grazing pressure in the wadi. At the moment the situation does not seem alarming.

However, if the number of livestock is allowed to increase at the present rate for a long period of time, one can expect to face problems in terms of environmental impacts and shortage of fodder. In order to avoid such a situation, stock taking and assessment of the fodder resources should be done in the project area. At the moment, it is not quite clear have many small ruminants can be fed per farm with the present farming practices.

4.5 Ecological sustainability

With reference to the observations above (4.1 - 4.4) the project is found environmentally sustainable. To maintain environmental sustainability in the future, the following three conditions are considered necessary:

1. The monitoring of key environmental parameters (ground water level, soil salinity and alkalinity, invasion of sand, number of livestock) should continue
2. Continuous action must be taken against sand movements
3. The number of livestock needs to be adapted to the fodder production on the farms, taking into consideration that the farms need to produce enough cash to cover farming expenses, living costs and revolving fund. The fodder resources need to be assessed based on these conditions.

In the opinion of the reviewers, item 1-3 above require presence of project personnel for a long time.

5 The project's impact on food security and household economy

The project secures basic subsistence, fodder and cash to the Hawaweer who are part of the project. The Hawaweer are very concerned with their animals and the various households have goats, sheep and camels although the number varies. Women and men find cultivation of fodder important and often mention the availability of fodder as positive when asked about the importance of the project. There has been an increase in the number of animals kept by the farmers. There is now a tendency, however, that the recent introduction of a new and high yielding goat make people aware of the possibility of having fewer animals and still get sufficient milk.

The nomadic pastoral lifestyle influences the economy in the sense that animals are important both for livelihood and prestige. Animals are also a main source of capital. On the one hand some may cultivate fodder for their animals in some periods instead of food crops. On the other hand animals are also important with regard to livelihood security and their produce in the nutritional setting of the nomads.

In the group interviews presented in appendix 2 the farmers were asked about shortages of food last year compared to before the project started. It seems clear that the period of food shortage has been substantially reduced by the project. There are still periods of food shortage, however, particularly in May, June and July. This may partly be a consequence of some of the farmers selling out too much of their winter wheat after harvest, at a time when prices are also low.

Income earning possibilities are first and foremost related to sale of crops and animals.

The Hawaweer participating in the project do not participate in the seasonal migration to the Nile in the date season. As labour migration to the Nile region used to involve the whole family: women and men taking part in different kinds of work in relation to the date harvest, this is becoming incompatible with their more settled life and responsibilities with regard to farming activities in the broad sense. Now the families have to remain in the project area as they can not leave their own farms. Interesting with respect to the economy of the various households is the fact that the nomads are now more settled and live closer to the project. Moreover that the women also participate in farming and thus, express a wish to settle. This affects their economy both with respect to what they see as needs with regard to, e.g. material equipment.

Organisation and availability of marketing and storage of produce?
Organisation and availability of marketing still needs to be worked on,. The project management is now trying to improve the marketing procedures in order for the Hawaweer to be patient enough to wait to sell until the prices for their produce is at its best. It has to be taken into account that the nomads live in a marginal area and find themselves in the periphery concerning markets both with respect to transport of goods, information about prices as well as with access to knowledge about what kind of goods are being demanded and supplied at what time. However, it should be seriously considered whether the farmers should concentrate on a more limited number of crops for marketing only, such as wheat, okra and onions, and cultivate other crops for subsistence and fodder. Such a choice of crops should be part of an overall marketing strategy for the project.

Concerning storage the present facilities are sufficient given the present level of production. One has to assume, however, that production will increase substantially. In that case more storage capacity will be needed in the future.

Organisation and sustainability of supply of inputs?
At present the project has approximately 2 months of fuel supply for every pump. In this sense there is an organised and relatively sustainable supply of inputs. It is hard to predict, however, what levels of fuel shortages that can be expected in Sudan, for how long they can last, and what policies of rationing the government may apply. Based on recent developments in the technology of renewable energy sources such as solar and wind systems, there may be good reason to re-assess the choice of energy source.

Other inputs, such as seeds, seedlings and fertilisers seem to be generally available. It is important, however, to be able to make the purchases in a co-ordinated way and in the right time in order to secure the best qualities of seeds and seedlings. Availability of spare parts for pumps and engines is a possible potential problem because the equipment which has been installed is larger than what is common in Sudan.

6 Economic sustainability

6.1 Farm income

The incomes and expenses directly related to the farming activities were examined in collaboration with the project staff. Appendix 3.1 shows the assumed income per farm in 1998, first according to the project review in November 1995 and then according to new estimates.

Expected yields have been reduced substantially from the estimates in the review from November 1995. The background for the reductions in **expected yields** is the low **actual** yields achieved so far. Wheat can serve as a good example: In the old farm (phase 0) average **actual** wheat yields increased from 5.3 sacks/feddan in the 1995/96 season to 5.6 sacks/feddan in the 1996/97 season. In the new farm (phase 1) the increase in **actual** yields was from 1.7 sacks/feddan in the 1995/96 season (the very first winter season in phase 1) to 2.2 sacks/feddan in the 1996/97 season. These figures indicate that **actual** yields are improving over time as the soil gets better by cultivation, and there is probably a substantial potential for further increase. However, the figures also indicate that 10 bags/feddan, which is the **expected yield** for phase 1 according to the review in November 1995, is far too optimistic in the short run. As a result of the experiences that have been gained, **expected yield** of wheat has been reduced to 4 sacks/feddan in the present estimate (appendix 3.1). Similar adjustments have been made for other crops.

On the other hand, producer prices in Sudanese pounds have increased, so that the estimated total gross income per farm in Sudanese pounds has increased from about 1.8 mill. in the old estimate to about 2.3 mill. in the new estimate.

In the first six rows of appendix 3.2, the farm income has been calculated as totals for the whole phase 1 farming area and converted to US$. The total farm income according to the new estimate is only about half of the estimate in November 1995 when converted to US$, in spite of the higher figures in Sudanese pounds. This is due to a dramatic weakening of the Sudanese pound relative to US$.

It must be emphasised, however, that the reduction of estimated farm income by about 50% (from US$ 210,000 to US$ 104,000) is not really caused by changes in the exchange rate. The farm gate producer prices have by and large increased at an equally high rate as the "price" of the US$. Instead, the whole reduction in estimated farm income can be explained by the reductions in **estimated** yields.

6.2 Project budget

An estimated project budget is presented in appendix 3.2. Even with new estimates, the farming costs are about the same as before. Family costs were also estimated in terms of living expenses for a family of 8 members including food, clothes, school fees etc. Again, the final amount was almost the same as the estimate from November 1995.

Project organisation is also well in line with earlier estimates. These costs were not included in the estimate from November 1995, because at that time project organisation was assumed to be transferred to phase 2 in 1998.

It appears from appendix 3.2 that the project will need a support in 1998 in the size of order of US$ 200,000.

6.3 Revolving fund

Initially, some contributions from the farmers were collected in kind, notably straw that can be sold for fodder. From the winter season 1996/97, US$ 200 in cash is being collected from each farmer to a so-called "revolving fund". This is a very substantial contribution in the sense that it represents about half of the value of the winter crop yields for many farmers. However, this amount is only a contribution to cover some of the direct farming costs, not a revolving fund in the sense that money is set aside to support further extensions of the project in terms of new wells and new farms.

The crucial figure with respect to revolving fund in appendix 3.2 is the row called "Balance". This is the total farming income, less the total farming costs, less the family costs. This balance was +35,000 US$ in the estimate from November 1995 and -64,000 US$ in the new estimate. Again, this dramatic change can be fully explained by reduced yield expectations. The positive balance of 35,000 US$ in the old estimate was the amount that was assumed to be set aside for the revolving fund.

From these estimates it seems as there is still a way to go to make phase 1 economically sustainable. The main immediate challenge on the economic side is to increase yields. Increased yields may come as a result of several small improvements such as better knowledge among the farmers, more efficient use of manure and fertilisers, better quality seeds, adjustments in cropping practices, improved harvesting techniques, adjustments in irrigation practices, and changes in the crop mix.

7 Institutional Sustainability

7.1 Institutions and training programmes for beneficiaries

Concerning the project in general the Farmers Committee is the responsible body for the various activities performed within the project. The Farmers Committee is responsible for maintenance and repair of irrigation structures, financial management of revolving funds, marketing, organisation of work such as harvesting, planting of trees, ploughing, fencing and building shelter belts. The Farmer's Committee seems at present to function well. The Farmers committee is based on traditional structures of authority and their power as such is thus not questioned. It is, however, difficult to know exactly how efficient this committee actually is and what kind of knowledge this institutional body possesses concerning repair, maintenance, distribution of work, sustainable irrigation and expansion. The Farmer's Committee will also in the future need supervision and advice from experts within the various relevant fields.

Farmers are today trained in farming activities. Also, selected farmers are trained to manage repair and maintenance of the pumps. Until now there has been only one breakdown. One pump was lost in the well, and a new pump was installed after some days. It is difficult to know how efficient the training in pump maintenance and repair has been. However, the extensionists and technical staff on the project see their role mainly as advisers in order to train the farmers themselves. This being said there is now and in the future still need for professionals at the project site.

Among the farmers no program have yet been set up in order to secure training of managers and leaders. Such training programmes should be encouraged in order to secure economic-self-reliance, sustainability and environmental awareness.

Organisations to take on marketing and input supply for agricultural have to be considered for the future, but at this stage this is handled satisfactory by the farmers committee. The present arrangements will probably work well as long as the total production for sale is small enough to be marketed within the project area.

7.2 Management and leadership training

The total project staff includes 15 employees: Project director, technical advisor, farm manager, logistic manager, field extensionist, assistant field extensionist, women extensionist, data manager, assistant data manager, pump operator, two tractor drivers, truck driver, security guard, and labourer. The total of salaries is about US$ 100,000 per year.

The staff seems very well qualified and engaged in their work. Moreover, training among staff members is indirectly achieved as the various extensionists have assistants both at the project as such and within the Women's program. However, further competence building among the staff is important in order to secure expertise within Sudan.

Concerning the Women's Program there are, as described above, training programmes initiated. The aim is that women themselves will be able to take on training responsibility with regard to the various activities as well as the running of the Centre as such. However, until now there is no institutional set-up for women's activities. Women do not yet have a formal organisation and they are not represented in the all male Farmers Committee. At present the women's group can only reach the project managers and the Farmers Committee through the employees at the Women's Program. This situation has to be improved: The employees at the Women's Program were of the opinion that the women should be organised in one committee where the leader could have an institutionalised co-operation directly with the leader of the Farmers Committee. Given the strict sex-segregation in the Hawaweer society women and men should, however, have separate committees.

8 Conclusion and recommendations

8.1 Conclusion

Reviewing the project one must consider the fact that the present farmers were nomads which means that agricultural production and community based planning of economic surpluses are newly introduced activities to the local community involved. On this background, many of the results that have been achieved are impressing. This includes the spectacular "greening" of an area which was captured by the desert, the adaptation of the nomads to elements that are new to their culture, the thorough monitoring program, and the immediate benefits to the farmers in the form of improved environment and livelihood security.

Still, there are elements that need more time in order to be settled in a convincing way: The yields in phase 1 farms are still not enough to pay for the total of the farming family's basic consumption and the agricultural inputs, including diesel for the pumps. It still remains to be seen whether the actions taken against sand movements will be efficient enough. It is unclear whether the institutions controlled by the farmers/nomads themselves would be able to manage the project without the presence of the project management. And the women's program, which is still in its infancy, needs more time and more emphasis before it can sustain itself. Interesting in this respect is that several women during different meetings mentioned that if the project was to be finished now, the Women's program would not sustain.

Following from this we suggest that phase 1 needs some more time, and that phase 2 should not be initiated in 1998. Much of the attention from the project management will have to be drawn to improving phase 1 with respect to the items mentioned above. It is important, however, to start making plans for phase 2 for future implementation. Phase 2 should not be an automatic replication of phase 1. It is very important at this stage to draw upon all the experiences made in phase 1 when planning for phase 2. Even key elements like project size and choice of energy source for water pumps should be considered again when planning for phase 2.

It appears that the project will need a budget allocation of about US$ 200,000 to sustain the project personnel and the phase 1 activities (appendix 3.2) In the opinion of the reviewers, budget allocations in excess of that amount would be acceptable for well planned activities within the following areas:

- Strengthening the women's programme within the project
- Further actions to protect the project against sand movements and reclaim the area that is presently covered with sand dunes
- Competence building among staff and among the leaders of the Hawaweer farmers themselves, including both men and women

8.2 Recommendations

- Planning of phase 2 should be initiated, but not for implementation in 1998.
- Crop yields within phase 1 farms must be increased to make the project economically sustainable. For this to take place, crop mix, irrigation practices and farming practices should be re-assessed and improved if possible.
- The women's component within the project should be strengthened in terms of more funding, more attention from the project staff, and more allocation of agricultural land
- A women's committee should be established in addition to the existing farmer's committee.
- Actions against sand movements and efforts to reclaim land presently lost to sand dunes should be given high priority
- Competence building among staff and among the leaders of the Hawaweer farmers, including both men and women, should be given high priority
- As the project moves into a more permanent mode, one should re-think which parameters are needed to continue monitoring and at what interval in order to assess the environmental, social, and economic implications of the project. The potential uses of data for other purposes than the project itself should also be considered.
- A gender analysis should be carried out in 1998.
- A new project review/evaluation should be carried out in 1999, also assessing the results of phase 0 of the project.

9 Literature

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APPENDIX 1

Terms of Reference for the Review of Um Jawasir Project in Sudan

1. Background

ADRA started its support in the area through providing relief assistance to the population after the droughts in the 1980s. Planning of the Um Jawasir project started in 1986, and was to be implemented by ADRA to support nomads of the Hawaweer tribe. The project has, for planning and progress evaluation purposes been divided into different phases. Phase 0, funded by NORAD's SSE-programme, started in 1990 through the digging of four wells for water supply after the droughts. Funds for three-year phase 1 (1995-97) was granted by NORAD in 1995 and included the construction of six bigger wells and agricultural training. Included in the plans for phase 1 were also plans for extending the project into two consecutive three-year phases for 1998-2000 and 2001-2003. Start-up of phase-2, would be determined by the progress made during this phase and any political decision made by Ministry of Foreign Affairs/NORAD. Although an underlying issue from NORAD has been that the investment costs per beneficiary were considered high in relation to the number of beneficiaries of the project.

In November 1995 Noragric undertook a review of the progress of the phase 1 of the project. The main focus was to review the project's compliance with the SSE-programme's objectives and to review the progress made so far during phase 1. The main conclusions of the mission were : a positive impact on the food security situation had been obtained, however, attention should be given to monitoring the environmental impact of the increased water use (impact on aquifer, salination problems etc). The viability of the project by the end of phase 1 would be determined by the projects ability to build up revolving funds, to reduce the need for funding from NORAD in the consecutive phases. The mission through its review and calculations suggested a feasible system of building up a revolving fund from water tariffs so that after the phase 4 of the project could expand using its own funds. Other comments from the team was the need to strengthen the gender aspects of the project and review the marketing possibilities.

The review team suggested that a review of the project be undertaken at the end of the phase 1 of the project and before the application for a phase 2 is submitted. In 1996 the Parliament decided to change SSE-Programme concept integrating the

projects into the ordinary budget lines for NGO-projects. In addition there has been strong signals to phase out SSE-activity in Sudan.

2 Specific terms of reference for the review team

It is on this background that a review of the project will be undertaken by Noragric, primarily to assess the progress and impact of phase 1 of the project and the economic, ecological and institutional sustainability of the project. It should also assess what measures needs to be addressed in order to improve the sustainability of the project. The more specific terms of reference will therefore be :

I. Project progress and impact

* Overall project progress
  A brief assessment of the overall project progress should be undertaken, specifically focusing on the achievements of Phase 1 in relation to the set targets/plans for phase 1. The team should review the monitoring system set up for reporting project progress.

* The gender aspect
  A description and an assessment of the activities introduced as well as the organisational set-up should be made. How have they been designed to fit the traditional division of labour/task in the tribe, have they been established on the basis of traditional women groups, has a gender analysis been undertaken? What measures have been introduced to ensure sustainability of the activities introduced ?

* The environmental impact
  A brief review of the project's actions in relation to monitoring the impact on the environment should be undertaken.
  - Monitoring system of water resources in the aquifer
  - Survey of potential salination of soils in the irrigated areas
  - Actions towards sand movements
  - Discuss the impact of grazing, and potential increase in animals due to improved livelihood security as a result of the project

* Impact on food security
  The team should review further the impact on the food security, including a discussion on food availability and food supply. What opportunities for income-earning are available (sale of animals, casual work). Have the number of animals increased as a source of income due to improved economic situation for beneficiaries of the project ? In what degree does the traditional nomadic/pastoralist lifestyle influence the economy of each household? Organisation and availability of marketing and storage of produce. Organisation and sustainability of supply of inputs.

II. Sustainability of project

* Economic sustainability
  The team should review the economic sustainability of the project activities in relation to the suggested system of building up revolving funds. The sustainability and feasibility of establishing a sustainable system within a certain time-limit should be thoroughly discussed with the project management and beneficiaries

* Ecological sustainability
  In view of the findings from the systems regarding monitoring of environmental impact an assessment of environmental sustainability should be made. And the conditions on which environmental sustainability could be maintained in the future should be assessed.

* Institutional sustainability
  The team should assess and discuss the institutional sustainability of the project activities. What institutions have been established and what training programmes have been given in order to prepare for the farmers/population themselves taking over the different activities ?
  - maintenance and repair of irrigation structures
  - land preparation
  - financial management of revolving funds
  - organisations to take on marketing and input supply for agricultural activities
  - management and leadership training
  - the institutional set-up of the women's activities

3. Composition, Time and Place of Review Mission

The Noragric team will comprise Fred Johnsen (mission leader) and Kjersti Larsen and will take place in the period 17. to 27. June 1997. It will during this period stay mostly in the project area working with the project staff, however the final programme of the mission should be discussed with project staff upon arrival of the team. Before departure the team shall give a short presentation of their main findings to the project staff and management.

Upon return the team will produce a short report for NORAD in compliance with the above-mentioned terms of reference.

Yours sincerely

Sidsel Grimstad
SSE-Co-ordinator

Appendix 2

Summary of group interviews in phase 1

Item	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6
Number of farms represented	4 - 6	3	5	4	4	3 - 4
Most preferred crop	Wheat	1. Wheat 2. Alfalfa	1. Wheat 2. Okra	Wheat	Okra and wheat	Wheat
Increased stock of small ruminants over past 1 year	5 to 8 4 to 8 5 to 8 5 to 10	8 to 10 15 to 20 10 to 15	2 to 10 8 to 10 15 to 20 15 to 20	4 to 8 5 to 12 6 to 12 1 to 3	3 to 7 13 to 10 2 to 3	Increased by 7, 6, 6 respectively
Use of animal manure	On wheat, alfalfa and onion	Mostly in alfalfa	On alfalfa, okra and date palm seedlings	On dates, vegetables, onion, alfalfa	On date palms and vegetables	On alfalfa and vegetables
Food shortage period last year	June - September	April - June	May to July, July was the worst month	End of April to beginning of July	October and June	July and August
Food shortage period before project	Most of the year	Twice as long	Worst in December - February	Mostly throughout the year. When rain was good, food was enough in December - June	6-7 months, unless there was a good rain	Some were short of food all the year, others (by the Nile) had enough food in September-October and April - May
Attitude towards taking over responsibility	Willing to take over from the start of next year, eager on a new extension of the project.	Absolutely willing to take over, but would be better prepared after one more year.	Ready to take over, but one more year would be good.	Willing to take responsibility, but one more year is needed.	Willing to take over, but would be in a better position after one more year.	Soil is getting better, but another year of support would be helpful.

Appendix 3

Indicative budget for 1998, phase 1 farms

A 3.1 Estimated farm incomes for 1998

			Estimate from November 1995*				New estimate from June 1997			
Crop	Season	Unit	Plot size, fed-dan	Yield per fed-dan	Selling price	Income, LS**	Plot size, fed-dan	Yield per fed-dan	Selling price	Income, LS
Alfalfa	All year	Bund-les***	0.50	1000	500	200,000	0.50	3000	300	450,000
Okra	All year	Sacks	-	-	-	-	0.33	24	50,000	400,000
Beans	Winter	Sacks	0.50	6	30,000	72,000	1.00	4	80,000	320,000
Potatoes	Winter	Sacks	0.25	20	10,000	40,000	-	-	-	-
Wheat	Winter	Sacks	2.00	10	18,000	288,000	2.00	4	50,000	400,000
Other crops****	Winter	-	0.25	-	-	100,000	0.17	-	-	0
Other crops****	Sum-mer	-	-	-	-	-	0.17	-	-	0
Onion	Winter	Sacks	0.50	100	7,000	280,000	-	-	-	-
Onion	Sum-mer	Sacks	0.50	100	8,000	320,000	0.5	30	25,000	375,000
Sorghum grain	Sum-mer	Sacks	3.00	4	10,000	96,000	2.00	4	30,000	240,000
Sorghum straw	Sum-mer	Bundle s	-- " --	1000	175	420,000	-- " --	100	400	80,000
Fodder sorghum	Sum-mer	Bund-les	-	-	-	-	0.50	300	250	37,500
Total						1,816,000				2,302,500

* Refers to the project review report (Johnsen, Deelstra and Rønningen 1996), p. 33

** Income was estimated in November 1997 as Plot size * Yield * Selling price * 0.8. The factor 0.8 gives a 20% reduction in order to account for uncertainties in yields. In the new estimate from June 1997 such uncertainties have instead been accounted for by using conservative yield assumptions.

*** The bundles assumed in June 1997 did not have the same size as those assumed in November 1995.

**** In the estimate in June 1997 a small area was assumed as garden with various vegetables for home consumption. No monetary value has been set for this cultivation.

A 3.2 Estimated project budget for 1998

Item	Estimate from November 1995*	Estimate from June 1997
Income		
Gross income per farm, LS	1,816,000	2,302,500
Number of farms	72	72
Exchange rate	0.00133315	0.0006250
Basic income, US$	174,312	103,613
Productivity increase, 15% and "extra increase" 5% (rounded)	36,000	0
Total farming income, phase 1, US$ (rounded)	210,000	104,000
Direct farming costs		
Fuel	60,000	60,000
Wells maintenance	15,000	5,000
Vehicles operation/management	8,000	12,000
Seeds and other	22,000	22,000
Total farming costs	105,000	99,000
Family costs**	70,000	69,000
Balance***	+35,000	- 64,000
Project organisation/ investment****		
Personnel	0	100,000
Operating /support costs	0	35,000
Approximate need for support in 1998		199,000

* Refers to the project review report (Johnsen et al. 1996), p. 33-35, 40-41

** New estimates of family costs were made in June 1996 by listing cost items, calculating the costs per family in LS and converting the totals to USD.

*** Balance = Total farming income - Total farming costs - Family costs.
The positive balance in the estimate from November 1995 was assumed to be the contribution to revolving funds for further extensions of the project.

**** In the estimate from November 1995 these costs were shifted to phase 2 of the project.