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Rada Integrated Rural Development Project

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INVENTORY STUDY

REPORT PHASE I

4.08.046

November 1990

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Republic of Yemen
Ministry of Agriculture
and Water Resources

Kingdom of The Netherlands
Ministry of Foreign Affairs
Development Cooperation
(Asia) Department

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INVENTORY STUDY, REPORT PHASE I

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1. INTRODUCTION

1.1 Background

In the report RIRDP - Eleven years of experience in rural development - the RIRDP submitted a proposal to extend its activities gradually to the whole province of Al Bayda. It was stated that a judicious approach would be applied to expansion: activities which have not reached maturity or have not proven to be successful, at least in operational terms, would not be expanded.

The evaluation mission of June 1989 supported this idea: 'The mission recommends that extension to Al Bayda district should be one of the main aims of the Project, to be reflected in the Plan of Operations for the years 1990 - 1992'.

In order to comply with the caution of the evaluation mission to base the required re-distribution of manpower and funds between Rada and Al Bayda on 'a careful analysis of resources and priorities', the Plan of Operations 1990 - 1992 called for an inventory master study to be carried out in the beginning of 1990. To this effect provisions were made in the Technical Assistance budget for the years 1990 and 1991.

Subsequently, in April 1990, a proposal was made for a study 'to identify the most promising areas in terms of development opportunities and to gauge the development priorities of the rural population'. This proposal was approved and preparatory meetings were held. As a result a female anthropologist was assigned to the team to study women and development aspects and to carry out a women impact assessment.

The team was fielded by the end of September 1990. On 10 October the study team discussed the proposed approach with the RIRDP management and the Royal Netherlands Embassy sector specialist for rural development. In this meeting a change of emphasis for the study was formulated in view of new developments since April 1990 (e.g. the unification of Yemen on 22 May 1990). On 31 October one study team member and the RNE sector specialist for rural development discussed the changes formulated on 10 October with the Yemen desk staff in the Netherlands. It was agreed that the study should form the basis for a well balanced development in the Al Bayda Province. To this end, it would be important not only to consider the existing sectors under development in the RIRDP, but all sectors in order to obtain a better picture of the potential subjects for total development of the Al Bayda Province.

Thus, the study team prepared an updated study proposal in November 1990 including a revised staffing schedule and phasing of the study. See Annex A. This updated study proposal has been accepted as the final Terms of Reference upon which this phase I report has been based.

1.2 Interpretation of the terms of reference

The study proposal, dated May 1990, has been discussed with the General Manager of the RIRDP, the teamleader of the TAU, the PME section of the RIRDP, the project manager of Euroconsult, the sector specialist of the Dutch Embassy, and the responsible project officer of DGIS. Their comments have led

to the current updated study proposal, dated November 1990. The difference between both versions, mainly concerns:

- the change in focus to extend present RIRDP activities to the entire Al Bayda province into an inventory of potentials for development interventions in this province;
- inclusion of a women impact assessment;
- inclusion of a comparative element of sectorial performance.

The above mentioned modifications have been authorised in a meeting at DGIS on 31 October 1990. These modifications have some consequences for the implementation of the inventory study and will be explained below. Moreover, the definition of the study area has also been interpreted by the study team, the RIRDP management team and the TAU teamleader.

(a) Inventory of potentials for development interventions

The inventory study should form a basis for a well balanced development in the study area. To this end, it will be important not only to consider the existing sectors under development in the Rada district, but to include more sectors to obtain a better ("more complete") picture for total development in the study area. Hence, the inventory study will present the perspectives for future development interventions and will provide the basis for sectorial development, development of a group of sectors, and for smaller and larger geographic areas.

The consequences are that the inventory study will provide a broad-based sectorial orientation and cannot go too far into depth due to time restrictions.

(b) Women impact assessment

A women impact assessment (WIA) aims at assessing, in advance, the expected effects of anticipated interventions. As this issue was not included in the original terms of reference for the inventory study, the consequence will be that an insight in the activities of the Rural Women Extension Section of the RIRDP in the Rada district is required, prior to the formulation of expectations regarding the impact of possible development interventions on rural women. The assessment of expected effects on women, thereby ascertaining that the position of women will be strengthened, is especially important in sectors in which proposed development interventions are not specifically checked for the position of women. A more detailed interpretation of the terms of reference regarding the WIA is presented in Annex A.

(c) Comparative elements

One of the authorised objectives of the study is to compare sector performance in the study area with the sector performance in other provinces and at the national level. Here are some considerations.

Firstly, the sector performance will be defined by using selection criteria. This approach will be implemented for the study area, being the geographic entity of Al Bayda district. Although much information is available for the Rada district, its sector performance is not established on basis of the selection criteria established by the inventory team. If this should be the case, the study team will largely run out of time.

Secondly, comparison of sectorial performance in the study area with sectorial performance at provincial or at national level requires extrapolation of statistical information from district level to higher administrative levels. Statistical information of the study area is incomplete and can only partially be used for this purpose. However, by using social parameters, the requested comparison will likely provide more useful information on the relative importance of the sector under consideration.

Thirdly, the unification of the Yemen has not yet led to unification of statistical information at the national level. It is expected that this effort will take several years and should not be the burden of the inventory team. It is therefore proposed to compare sectorial performances in the study area with those in selected provinces, from which one might be in the former South Yemen, and depending on data available, with the national level in the former North Yemen.

Finally, it is understood that the determination of the relative importance of a sector will completely depend on the data available, their accuracy and reliability. It is therefore proposed to concentrate on identifying trends in development as well.

(d) Definition of the study area

The Al Bayda province is divided into two districts, the Rada and Al Bayda districts. The Rada Integrated Rural Development Project has generated a large amount of information about Rada district, and has reported in detail on most of the district's potentials for development. As data about the Al Bayda district are virtually lacking, it has been decided to confine the terms of reference into an inventory study of Al Bayda district.

The study team has decided that it is important to concentrate its inquiries on areas where information is lacking or very limited. However, this decision will induce a time constraint factor. If the study area should include the entire Al Bayda province, more time should be devoted to office work. This work would include the gathering of data and sorting out the accurate part of the Rada district and to add this information to the data collected of the Al Bayda district.

The consequences of this decision are, that as a result of the unification of the Yemen in May 1990, the Al Bayda district should be regarded as a geographic entity, rather than an administrative entity. This means that for the study geographic boundaries have been chosen, and adjacent areas have been included. The reasoning behind this is a practical one: it avoids that the study includes only part of a catchment area or provides an incomplete picture on groundwater and land resources.

This means in clear terms that the study area (see figure 1.1) has been defined as:

- Al Bayda district;
- the Bayhan muderiya, which forms the main agricultural part of the catchment area of upper wadi Bayhan;
- the Nisab muderiya, which forms the entire catchment area of wadi Markha;
- the Yaffi muderiya, and especially the area surrounded by the tributaries of wadi Bana.

1.3 Limitations of the study

Availability and reliability of data

The study area can be characterised as a less developed and remote area as compared to other provinces. In the North-Yemen census of 1986, the Al Bayda province has been included. It appears more likely that the census data of the important areas such as the provinces Taiz, Ibb and Sana'a are more reliable as compared to the data collected for less-known and remote areas, such as the Al Bayda province.

The gap in reliable information concerning the study area has been larger than anticipated. More time had to be spent on the search for data. Moreover, the nearly absence of maps of the study area has resulted in the fact, that relatively more time had to be spent on collection of data in the field, and the verification of existing data.

The differences between the two former Yemen have resulted in different data collection and recording systems. Due to the existence of a few development studies and projects in some parts of the study area which belonged to the former South Yemen, some maps and project documents could be consulted. However, more recent data appeared unreliable as the monitoring and data collection systems have largely collapsed since the last years.

Some of the areas surveyed presently may belong geographically to two subdistricts (Nahiya/Muderiya) and/or to two different provinces (Governorate). It will be clear that for such an area data will not be readily available, and if available, they have to be interpreted carefully.

Time schedule and budget

In view of the above indicated gap in information and the revised terms of reference, two months have been spent to achieve phase I of the inventory study, instead of the six weeks foreseen in the study proposal. As a result, slight changes in the time table and budget of phase I and II of the inventory study have to be anticipated.

1.4 Presentation of this report

In the foregoing paragraphs, the background leading to the inventory study, the terms of reference, its interpretation, and the availability and accuracy of the existing data base for the study area have been discussed.

In the next chapter, the methodology of phase one will be discussed. Major elements are the preparation of a workplan, contacts with authorities, development of a checklist and the methodology of the village inquiries and choice of respondents.

Chapter 3 deals with the selection criteria and the methodology of selection, in order to arrive via a multi criteria analysis and selection system, to the priority classification for future development interventions.

The results of forementioned selection and the selection of priority areas are discussed and presented in Chapter 4.

Besides a sectorial focus, the inventory study will deal with thematic studies. These studies deal with themes that are not related to geographic boundaries, and that cannot be measured in one unique way, or concern cross-sectorial activities. These thematic studies are presented in Chapter 5.

One of the authorised objectives of the study is to compare sector performance in the study area with those in other provinces and at national level. This part is discussed in Chapter 6.

The end of phase one of the inventory study has been used to prepare the methodology, field questionnaires and workplan for phase two. This information is presented in the last chapter.

2. METHODOLOGY OF PHASE I

2.1 Introduction

Agricultural activities are probably not the main source of income of the inhabitants of the study area. Remittances from emigrants and incomes from people working in the yemeni cities play a very important role. Smuggling also forms an important source for cash income. But the majority of this type of activities takes place outside the study area.

However, nowadays agricultural activities will probably become the main source of income in the study area. Therefore it is of great importance that the inventory study will focus special attention on these agricultural activities, in relation to availability of water, migration, off-farm employment, and income generating activities of woman and returning migrants.

The main elements of the methodology of phase I are:

- to obtain a general view of the study area and an impression of the local situation;
- to establish contacts with authorities and other sources of information;
- the development of a checklist;
- inquiries directed at village level;
- to determine the logistics of Phase I.

2.2 Preparatory phase

During phase I, all administrative entities (nahiyas in Al Bayda district and some centres and muderiyas in Shabwa, Lahej and Abyan governorates) have been visited to allow the study team to form an opinion of the study area. This area, clearly defined in the terms of reference, comprises the entire Al Bayda district extended to its geographical boundaries rather than restricted to the administrative ones (see figure 2.1).

2.2.1 Contacts with the authorities

The following authorities and institutions have been visited:

- the Governor of Al Bayda province;
- the General Manager of the RIRDP;
- the TAU teamleader of the RIRDP;
- the Dutch Embassy;
- all the political representatives of the subdistricts;
- the local councils for development (LCCD)
- the officers in charge of the agricultural activities of each administration.

The purpose of consulting these sources was to obtain a general view of the study area and an impression of the situation.

2.2.2 The use of the available data

Several sources of information were used to collect literature for the inventory study. These sources are:

- The documentation centre of the Ministry of Agriculture and Water Resources in Sana'a;

- the RIRD library;
- The library of the Department of Irrigation (Ministry of Agriculture) in Aden.

Maps on different scales from the RIRD were used during the first phase. Some of the maps were prepared by the RIRD while others were available through the project. The topographical maps available are on scales of 1:50,000, 1:100,000 and 1:250,000. The maps were used for a global orientation only because the reliability of the maps appeared to be limited in several cases. Satellite photos of the entire area taken in 1987 at a scale of 1:100,000 and 1:500,000, have been made available to the study team. These photos show clearly where vegetated areas are located. These areas are marked from pink to dark red according to the density of vegetation. It has been found that the dark red colour represents areas which are intensively cultivated (usually irrigated crops). The pink areas mostly represent natural vegetation and scattered rainfed plots.

The photos were taken in October 1987 (the western part of the district on 11 October 1987, and the eastern part on 18 October 1987). In October, harvesting of crops takes place in certain areas (especially sorghum). These areas do not show up on the photos as red spots because they are not anymore vegetated. This could be misleading. Although these areas do not show up as agricultural land, they do have agricultural potential. This should be kept in mind.

The determination of exact positions in the study area was done by using a satellite scanner (magellan).

2.3 The quick surveys

After determining the most interesting agricultural areas to visit, a programme was prepared to cover the study area by fieldtrips. Seven trips were made, in which 28 areas were surveyed (see figure 2.2). Each trip required one to six days, according to the number and the importance of the activities in these areas. The detailed schedule is given in Annex E.

The total time spent on field trips amounted to 24 days. On a few occasions the team split to allow a greater coverage of the study area which means that 30 effective days were spent in the field.

The time schedule of the field trips was very tight. Usually, working days lasted at least 12 hours (from 7:00 am to 19:00 pm and sometimes even later). No account was taken of the fridays which are free days in Yemen.

As result of the bad condition of the roads, an average of four to seven hours per day were spent driving. The remaining time allocated to inquiries in villages. Seven days were spent in Aden, Sana'a and Al Bayda to meet officials and to collect data. In addition, an important amount of time was spent in the office in Rada to:

- * meet with the project staff, the yemeni authorities and the Dutch Embassy;
- * study the existing (RIRD) bibliography and collecting data;
- * write fieldtrip reports;
- * fill in data gaps on existing maps and to add the names of wadis, villages and areas to the satellite photos;
- * write the preparation reports for phase I;

STUDY AREA

Areas surveyed in phase I

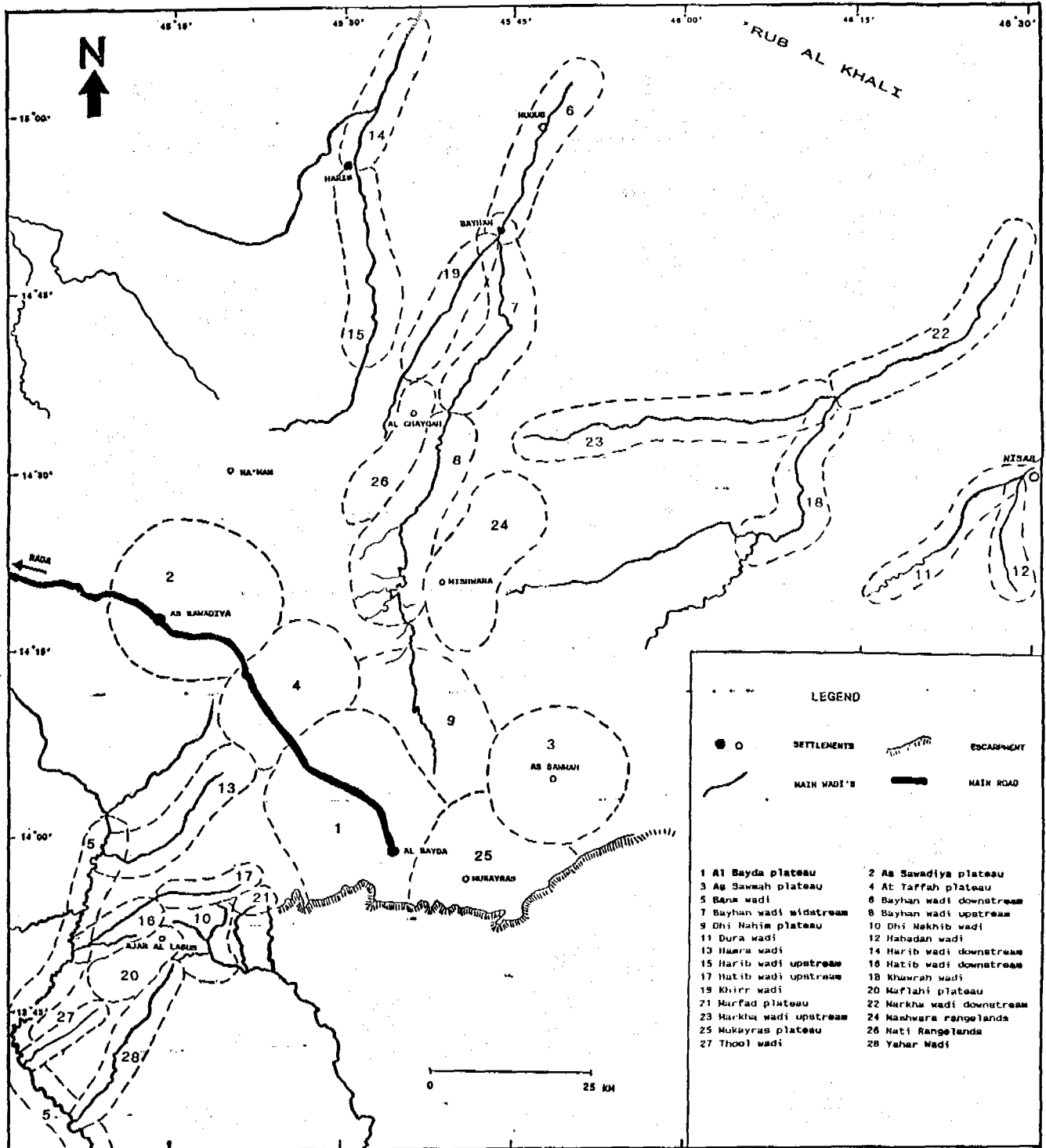


Figure 2.2

STUDY AREA

Al Bayda district and adjacent muderiyas

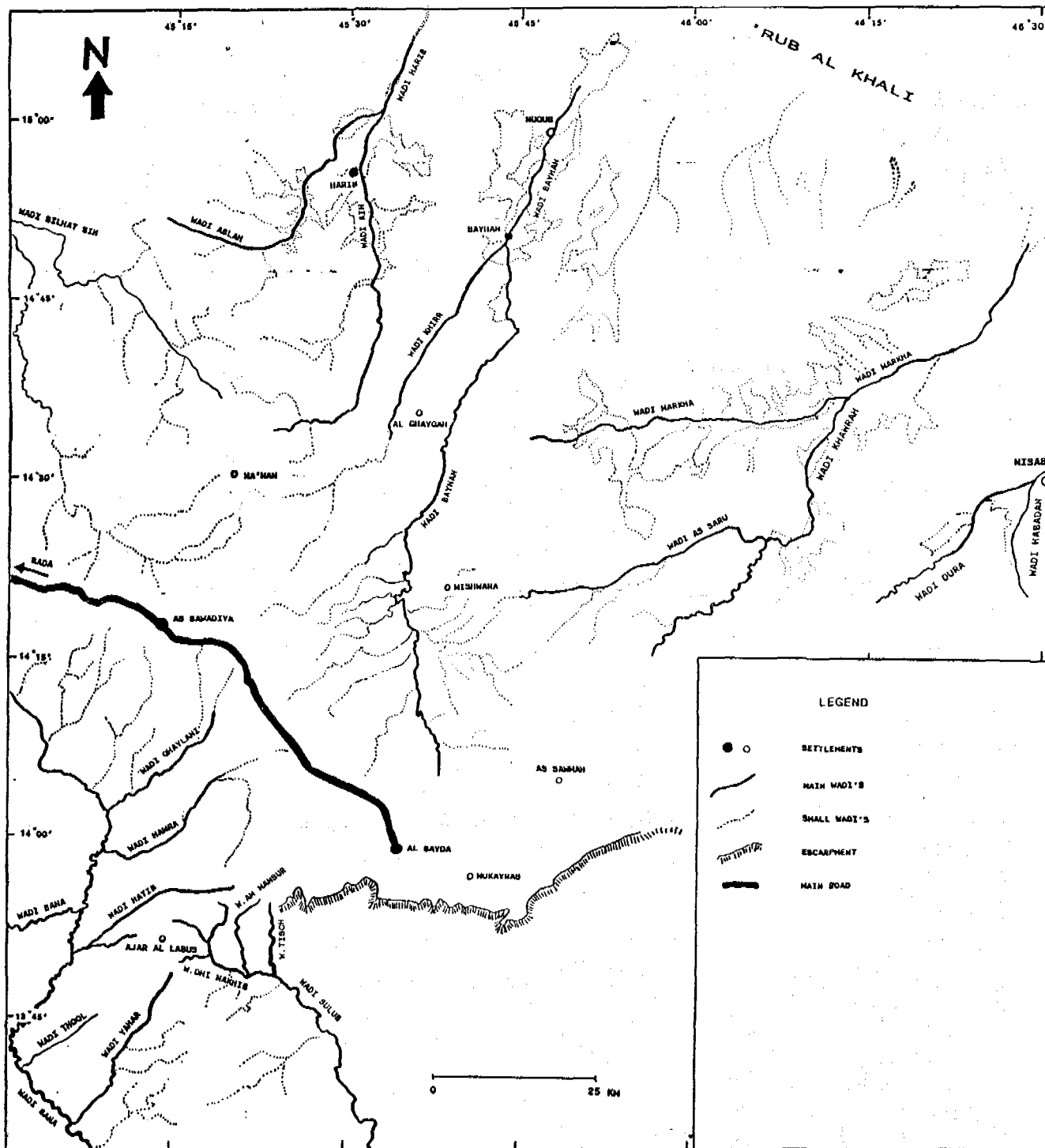


Figure 2.1

- * prepare the methodology and the questionnaires to be used in phase II;
- * maintain the cars and to organize the logistics;
- * explain the activities of the study team to the heads of sections of the RIRDP.

Completion of phase I took 53 full days of work, which means that phase I required two months instead of the one and a half month previously foreseen in the terms of reference.

2.4 Methodology of the village inquiries

2.4.1 The choice of the villages

During Phase I, only a quick insight of the general situation was intended. Therefore, no special sample of villages was taken. In the surveyed areas, the study team chose villages, at random, where potential was thought to be good, and also villages which looked rather poor.

2.4.2 The choice of the respondents

In former North Yemen

The local hierarchy in former North Yemen, usually requires that one first meets the sjeikh, agl or any other prominent person in the village. The study team would then ask other farmers to join the meeting, if possible, to allow a broader discussion. It was tried to include different social categories of inhabitants so as to obtain a complete picture of the social, economical and cultural situation of the village and its inhabitants.

In former South Yemen

The situation in former South Yemen is quite different from the above mentioned, since there are no sjeikhs or agl's. These traditional functions have almost disappeared after the revolution. In the administrative centre, a local administrative officer, usually a policeman, can be found. Traditional authorities can seldomly be found in the villages themselves. Therefore in former South Yemen, the study team met several male adults only. No women were interviewed since the study team had no female translator, which is necessary when speaking with women. Nevertheless, after one or two general meetings, it became clear that in this formerly socialist country, people still have some difficulty in expressing their thoughts and ideas when gathered in official meetings (because socialist policy is still very much alive). This became especially clear when discussing the system of cooperatives.

2.4.3 The inquiries

For the first inquiry (in wadi Hamra) a general conversation was held with an assembly of farmers and prominent persons. This conversation pointed out the general problems and feelings of the people about many different subjects, ranking from water availability, water rights, number of people, roads, schools, health centres, cultivated lands, crop yields, cash crops, general cash income, sharecropping, remittances, etc. This broad discussion with the villagers was necessary to understand their main concerns and the most important facts and problems.

On the basis of the first meeting, a checklist was prepared. The checklist was updated several times when new insight was gained, such as the

existence and functioning of agricultural cooperatives and marketing associations in former South Yemen. The improved checklist that was used at the end of phase I, is presented in annex B.

2.4.4 Water and soil sampling

The inquiries in the villages also included questions about availability of water and quality of water, either for irrigation purposes or for domestic use (see checklist). Samples of domestic water have been taken in most of the surveyed villages to be analysed in the RIRDP laboratory. For most of the surveyed areas the junior physical geographer studied the soil in order to assess its quality for agricultural purposes. For phase I, only a quick assessment of the soil was envisaged.

2.5 The reports on the field visits

Brief reports on the surveyed areas were written as soon as the study team returned to the office in Rada. They are used to compare the different surveyed areas, and to choose the most promising ones to be studied thoroughly during phase II. The few days spent in Rada after every survey, were also used to fill in the major data gaps on the existing maps, and to write on the satellite photos the names of wadis, villages and areas.

2.6 The logistics of phase I

The field trips were undertaken by part of the study team. The members are:

- * the team leader;
- * the counterpart to the team leader, head of the PME unit (Planning, Monitoring and Evaluation) of the RIRDP. He joined only some of the fieldtrips.
- * two human geographers of the University of Utrecht;
- * one physical geographer of the University of Utrecht;
- * one staff member of the PME unit of the RIRDP, working on a full time basis for the inventory study and acting as an interpreter and interviewer.
- * the translator of the team, who is also the driver of one of the two cars;
- * the driver of the second car.

The size of the team meant that sometimes seven to eight persons visited a village at the same time. The study team could rely on the hospitality of the people for food and lodging. In former South Yemen it was sometimes difficult to find accomodation since they are not used to accommodate foreigners. Nevertheless, the study team found that it was quite easy to find accomodation and that the people were friendly. It is remarkable that the inhabitants can accommodate seven to eight persons at once in their houses. In fact it was sometimes felt by the study team to be quite an embarrassment. For the second phase, other solutions must be found since the study team will spend several days and nights in the same villages.

3. SELECTION CRITERIA

3.1 Assessment of selection criteria

The objective of the development intervention programme is a sectorial and integrated focus on agricultural, socio-economic and institutional aspects with the following aims:

- securing as much as possible of food self-sufficiency of the population in the study area on a sustainable basis;
- reduction of dependancy on food imports and subsidies in the region;
- to improve the cashflow and living conditions of the rural population;
- improvement of public services, and strengthening of institutions and coordination;
- protection of the natural environment against over-exploitation and accelerated degradation of land and water resources.

These development aims integrate with the national objectives, which largely focus on the improvement of the viability of the agricultural sector in general.

The development programme is preceded by a planning process which comprises the following elements:

- determination of the physical and socio-economic resources;
- determination of the requirements of the rural population;
- calculation of deficits at present and at the horizon of the year 2000;
- comparison with other areas and at national level.

The above mentioned elements will assist in the selection of certain areas for improvement. The selection of an area for improvement will be done by comparison between its present situation and its potential or priority for future development. Consequently, the inventory and planning process should be guided by selection criteria and comparative elements that respond on one hand to development objectives, politics and finances of the government, and on the other hand to development potentials and constraints identified in each of the areas surveyed.

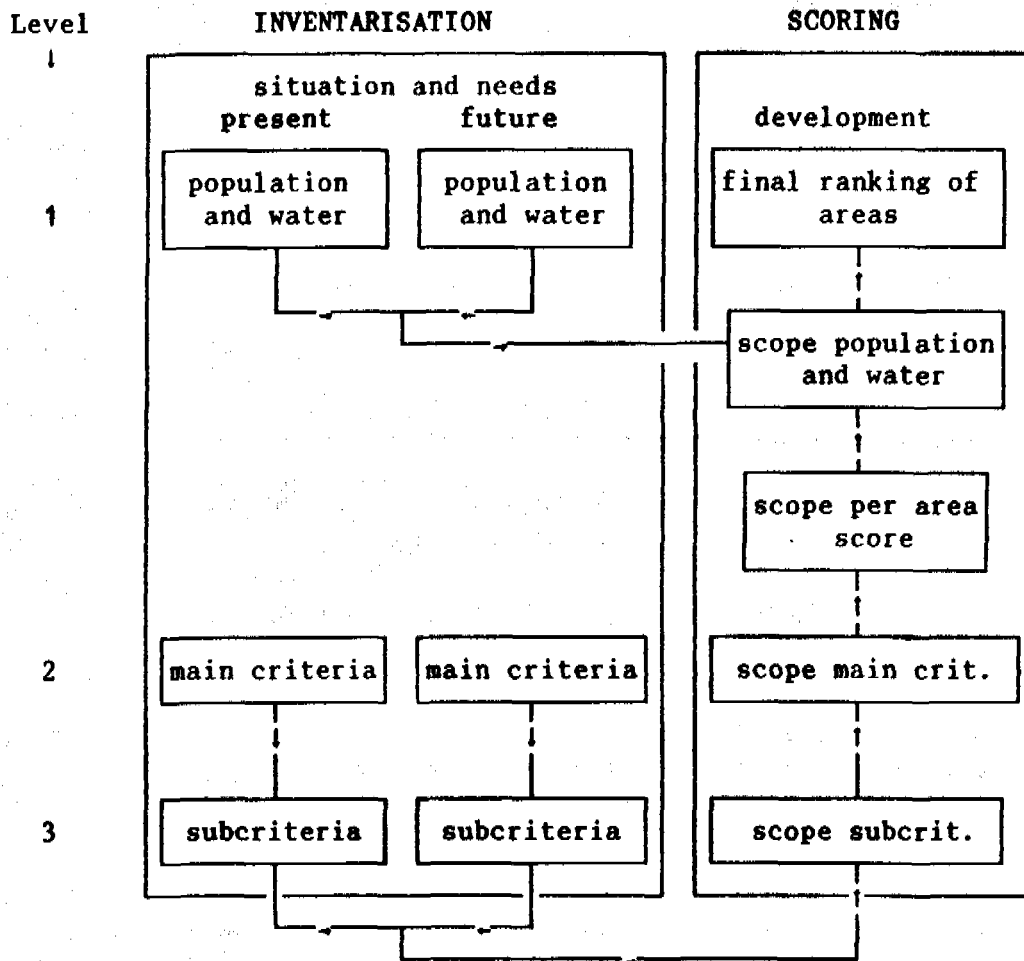
3.2 Selection criteria

The study team has decided to introduce a multi-criteria analysis and selection system suitable for appraisal and grouping of priorities. Its three levels are:

- priority classification for possible future development interventions;
- main criteria;
- subcriteria.

Priority ranking of small geographic areas will be based on the potential for development, the population size and density, and the availability (and quality) of water. The development potential of a certain area will be defined on the basis of main criteria and subcriteria. See figure 3.1 for the procedure followed.

Figure 3.1 A schematic presentation of the procedure followed in the multi criteria analysis



From the elements making up the planning process, various issues have been chosen. These issues are expected to contribute in a distinct manner to the determination of development priorities and potentials. These are:

- water availability and quality;
- agricultural potential;
- number and density of population;
- basic social infrastructure;
- accessibility;
- migration
- women and development;
- institutional environment.

However, some of these issues cannot directly be related to geographic boundaries and are difficult to measure or to estimate. Their effect on development cannot be measured in one unique way, but should be approached from different angles, as they often concern cross-sectorial activities. Consequently, these issues will be dealt with as thematic studies.

- As a result, the main selection criteria used in the inventory are:
- agricultural potential;
 - population;
 - basic social infrastructure (including accessibility);
 - women and development.

- The thematic studies may include:
- assessment of the land/water resources, and more particular the problem of the depletion of water resources;
 - migration and off-farm employment;
 - women and development;
 - institutional environment.

3.3 Selection of subcriteria

By using a limited number of main criteria, the error resulting from possible over or under estimation of one or more of the main criteria, might be large. Therefore, it has been decided to attach a number of key characteristics to each main criterion. An important benefit will be that over or under estimation of a few of these characteristics will be largely levelled out, and thus will have less severe implications for the main criteria. In total 24 of these characteristics or subcriteria have been chosen to describe or define in more detail the main criteria. The subcriteria chosen are:

Agricultural potential:

- availability of water for agriculture and water saving
- irrigated agriculture
- rainfed agriculture
- rangeland and grazing capacity
- cash cropping
- land conservation
- agricultural (cooperative) input services and extension centres
- credit and marketing cooperatives
- food self-sufficiency on an agricultural base

Population:

- number
- density
- self-sufficiency on a population base
- cash income from outside the area

Basic social infrastructure:

- schools
- educational experience
- health centres and sanitation
- domestic water supply
- electricity
- small scale rural enterprises
- travel time to main services

Women and development:

- girls school attendancy
- agriculture and livestock
- sanitation and health
- income from off-farm activities

3.4 Definition and use of criteria

The contribution of subcriteria to a main criterion is the backbone in interpreting the criteria. The criteria are defined as follows:

Main criterion agricultural potential

The possibility to increase the agricultural productivity (economically). This can be implemented in the following ways:

- reduction of the risk of crop failure;
- intensification of cropping;
- extension of production area.

Subcriteria

Availability of water for agriculture and water saving:

The contribution of water availability and water saving to the present agricultural productivity and to the future agricultural potential. Availability of water for agriculture and water saving have been linked together. When the potential to increase water availability is limited or even zero, water saving techniques still offer some scope to increase the agricultural potential.

Irrigated agriculture:

The human influence on availability of water for agriculture. The maximum level is reached (score 10) when the surface irrigated equals the maximum irrigable surface and when the techniques used result in an optimum benefit to agriculture.

Rainfed agriculture:

The natural influence on the availability of water on the the maximum rainfed arable surface with the best possible use of agricultural techniques and the possibility for extension of the surface.

Rangeland and grazing capacity:

The ratio between number of livestock (live stock units) and carrying capacity for grazing. Score is 10 if number of livestock and carrying capacity are in equilibrium.

Cash cropping:

The level of diversification in cropping and the contribution of cash cropping to cash income in the present situation and the possibilities for maximal improvement in future.

Land conservation:

Human influence and level of techniques to protect and control the land resource base from degradation, including the necessity to protect the land resources against degradation.

Agricultural cooperatives and extension centres:

The level and the availability of services given to support the farmer.

Credit and marketing cooperatives:

The level and the availability of services given to support the farmer.

Self-sufficiency on an agricultural basis:

The level of food self-sufficiency for home consumption within the local possibilities at present and the possibilities to increase the self-sufficiency rate per capita within the family in future.

Main criterion population**Subcriteria****Population number:**

The number of inhabitants within the area and the expected number in future. A low number of people results in a low score.

Population density:

The number of inhabitants per area related to the agricultural carrying capacity of the area. The highest score is given when population density and agricultural carrying capacity are in equilibrium. A very low and a very high density result in low score.

Self-sufficiency on population base:

If the present and the future population are able to be economically self-sufficient on the base of agricultural and/or non-agricultural income generating activities within the area.

Cash income from outside the area:

External input from money into the area from people who do not permanently reside in the area.

Main criterion basic social infrastructure**Subcriteria****Schools and attendancy:**

The number of primary schools (buildings) with six grades per number of people, and approximately 30 students in the age of 6-12 per classroom.

Educational experience:

The educational experience (technical training and secondary school included) and skills of adults (more than 12 years old).

Health centres:

Medical services (quantity and quality) related to the number and sex of people. The presence of a building without facilities results in a low score.

Domestic water supply:

Percentage of houses connected to a water scheme, either privately owned or by the government.

Electricity:

Percentage of houses connected to an electricity scheme, either privately owned or by the government.

Small scale rural enterprises:

The amount, variety and scale of present small scale rural enterprises, and their scope for future. Small scale rural enterprises may include food and repair shops, mills, brickmaking and construction, welding.

Travel time to main services:

Travel time to the main services: secondary school, health centre and hospital (doctor present).

Main criterion women and development**Subcriteria****Girls attendancy to schools:**

The percentage of girls in the age of 6-12 attending schools.

Agriculture and livestock:

The time women spend in these activities, their workload and the remuneration for these activities in the present situation and the possibilities for improvement (decrease in workload and time spent, increase in income).

Sanitation and health:

The role of women in and the attendancy of women to these services.

Income from non-agricultural activities:

- The percentage of present and possible future income generating activities (e.g. handicrafts);
- the diversity of the activities;
- the income resulting from these activities, either in cash or in kind.

Some subcriteria have been chosen in such a way that they are applicable for both the former North and South Yemen areas. To this end the agricultural input supply services have been linked to agricultural cooperatives and extension centres, and the agricultural support services to the credit and marketing cooperatives. Agricultural research is done in the study area, but will be included in the institutional part of the inventory.

Another important subcriterion is the land tenure. It is applicable to every area visited and will be dealt with in phase two of the inventory study. Therefore, it is not shown in the list of subcriteria. In the Al Bayda district, share cropping is more common than hiring of land, however, the major part of the land is privately owned by the farmers. In the adjacent areas in the former South Yemen, share cropping though forbidden, likely appears, however, information on this subject is incomplete and sensitive.

Often the population number and density in an area is not known or appears to be incompatible with official figures, and should therefore be estimated. Hence, at this stage it is impossible to include subcriteria such as growth and migration rates.

Accessibility of the area is expressed in terms of "travel time to main services", such as markets, hospitals, schools, and thus combines quality and quantity of roads. Mosques form part of the basic social infrastructure. However, they have not been included in the list, as the availability of a mosque is seen as a matter of the population themselves. Communication in the form of radio and television is very common in Yemen and is linked to the subcriterion electricity. However, telephone and newspapers are very scarce in rural areas.

Women and development has been indicated by using four sub-criteria only. Women in education, extension, training, leadership and institutions do not exist in rural areas. At this stage, also women in the informal sector have not been included.

3.5 Appraisal of criteria

To each sub-criterion a scale has been attached. In the case of agricultural potential, all sub-criteria determining this potential have received a scale 0-10, with 0 meaning completely absent and 10 being the maximal potential that the sub-criterion can contribute to the main criterion. The sub-criteria of the other main criteria have received a scale 0-5, with 5 being the highest score. Each score shows the absolute or relative suitability or importance of the sub-criterion for its main criterion. By comparing this score under the present situation with its potential or priority for future development, the importance of each sub-criterion to the main criterion can be determined. An example will further explain this.

The importance of cash crops (sub-criterion) contributing to the agricultural potential (main criterion) in a certain wadi should be scored. In the field it was observed that productivity of cash crops was already high. Hence, its potential for future development is not anymore large. The difference in scoring (scale 0-10) between present situation (8) and potential for future development (9) is small (only 1). In other words, the contribution of cash crops to the agricultural development potential in the wadi is low.

For a number of subcriteria, the maximum score cannot be reached. It will for example not be possible to set up a domestic water scheme for all the houses in a village due to their scattered location. Land conservation measures in several locations will be limited due to extraordinary costs involved.

The score of a sub-criterion resulting from the comparison between its potential for future development and present situation may be negative. This will be the case when a certain population has already over-exploited the actual agricultural potential. Consequently, sustainable agriculture is only possible when the population will reduce in future. Another example: at present, a small population of 2000 people living in an area with a very low agricultural potential, largely depends on remittances from migration. When the migrants return to their area, the population will increase and remittances will decrease and may even dry up. Consequently, over-exploitation of the agricultural potential will be the result.

The scoring of a main criterion results from addition of the individual score of each sub-criterion attached to the main criterion. The development potential of the area results from addition of the scores from all the main criteria, divided by the number of sub-criteria used in the scoring system. The score for the development potential generally lies between 1 and 3, meaning a restricted and a large number of subcriteria suitable for development respectively.

3.6 Priority classification

The main elements of the priority classification for future development interventions are: the development potential of the area, and the population number and density. An indicative criterion is the availability of water combined with water saving techniques to increase agricultural productivity. The following priority classes are distinguished:

- **high development potential and high population:** areas with a high development potential, a high population number and density, and possibilities to optimize water resources, and which are highly productive for the defined use, without significant limitations;
- **high development potential, but moderate or even low population:** areas similar to the above mentioned class, however, the population number and density are considerable lower;
- **moderate development potential and high to moderate population:** areas which are moderately productive for the defined use, limitations reduce expected benefits and/or increase recurrent costs;
- **moderately to low development potential and low population:** areas with a low population density, expected low productivity for the defined use, benefits are just high enough to justify required inputs, limitations severely reduce expected benefits and/or considerably increase costs for production and conservation.

The result of the use of the multi-criteria selection system working at three levels is a systematic analysis of potential and priority areas. Even when a particular area is not classified as a high priority one for future development interventions, its development potentials are shown. This system will assist both in planning activities and in the development of interventional programmes. In the latter case, emphasis can be placed on the development of individual sectors, integrated sector development, and on the development of geographic smaller and larger areas.

In some cases, the priority classification system can be overruled. For instance, when an area shows a high final score, but if all land belongs to one family making share cropping compulsory, development interventions might be rejected. It is also possible that a development project is already working in part of a priority area. This may result in rejection of the priority area for all or part of the proposed development activities, or will require a special agreement with the existing project for future development of the entire area.

It is possible that four or five of the areas surveyed fall in the high priority class. In that case ranking of priority is required, taking into account the relative importance of the area compared to other provinces and its synergy with national priorities.

4. RESULTS OF SCORING

4.1 Scoring of criteria and development potentials

The quick field surveys included 28 locations. The scoring of the subcriteria is based on the checklist, interviews and the field trip reports. The scoring was first pre-tested by three groups working independently, in order to establish the variation in answers. This variation appeared to be in the order of 10-15%, which is in view of the time available for the quick surveys, remarkable low. Nevertheless, the ranking between the areas was the same for each group.

At a later stage, the scoring system was explained to eight heads of sections at the RIRD, followed by a request to exercise (for the first time) the scoring system for the Rada basin area, the only area they all knew in common. Of the eight answers, only one answer was out of range. Taking away the highest and lowest extremes, gave a similar variation in the range of 12-15%.

The results of the scoring system for each subcriterion of each area are presented in alphabetical sequence in Annex C. Table 4.1 summarizes the result of the scoring system for each main criterion and the development potential for the area. In table 4.1 the areas are grouped together on basis of agricultural zoning (landtype). The agricultural zonings (landtypes) of the different areas will be discussed in paragraph 5.3.

Table 4.1 - Summary of the results of the scoring system for each main criterion and the development potential (DEV POT) per landtype

LANDTYPE	AG PT	POP	BSI	WAD	DEV POT
Plateau	15.5	-1.3	10.6	10.8	1.53
Smaller wadi's	16.9	0.3	12.4	11.9	1.74
Larger wadi's					
- upstream part	16.6	1.8	11.6	9.2	1.74
- downstream part	16.5	1.5	13.7	11.5	1.80
Rangelands	7.5	-1.0	7.0	8.0	0.98

main criteria:

AG PT	agricultural potential	POP	population
BSI	basic social infrastructure	WAD	women and development

It is interesting to note the differences in development potentials between the various land types. This potential for the rangelands is very low, as a result of the very low agricultural potential (availability of water) and over-exploitation of the areas.

The plateaus show a moderately high scope for development. The agricultural potential is still high, however, the carrying capacity of most of these areas to support its population to obtain a sustainable living from agriculture, has been reached or surpassed. The scope for improvement of the

basic social infrastructure and the participation of women in the development process is high.

The development potential of the wadi's is moderately high. The agricultural potential is still high, and there appears to be a large scope to improve the basic social infrastructure and the participation of the women in the development process. The smaller wadi's have almost reached their carrying capacity, or have already largely surpassed that stage, such as wadi Hamra and wadi Thool.

4.2 Results of the priority classification

The priority classification is based on the score for the development potential of the area and the population number and density. The future potential that available water combined with water saving techniques may have on increased agricultural productivity ("water scope") can be used as an indicative criterion. The occurrence of 28 areas justifies the use of not more than 3 or 4 priority classes. As three classes appeared to provide not the desired effect, the following four classes were used:

- high development potential and high population;
- high development potential and moderate to low population;
- moderate development potential and higher population;
- moderate to low development potential and lower population.

The result of the priority classification is presented in table 4.2. The graphic presentation of the development potentials of the areas related to population classes for number and density are shown in figure 4.1.

Table 4.2 - Priority classification for future development interventions

AREA AND NAHIYA OR MUDERIYA/ GOVERNORATE	SCORE DEV POT	POPULATION number/den	WATER scope
I <u>High development potential, high population:</u>			
Markha upper, Nissab Muderiya	2.38	H / L	3
Khirr, Bayhan M./ Na'man N.	2.21	MH / H	2
Bayhan lower, Bayhan Muderiya	1.88	H / H	2
Khawrah, Nisab Muderiya	1.88	H / H	2
Yahar, Yaffi Muderiya	1.88	MH / H	2
Maflahi, Yaffi Muderiya	1.83	H / VH	1
Marfad, Yaffi Muderiya	1.79	H / H	2
Bayhan mid, Bayhan Muderiya	1.76	VH / VH	2
Habadan, Nisab Muderiya	1.76	H / H	1
II <u>High development potential, moderate/low population:</u>			
Markha lower, Nissab Muderiya	2.04	M / VL	2
Bana, Yaffi Muderiya	1.92	VL / VL	1
Harib upper, Bayhan Muderiya	1.88	M / M	3
Harib lower, Marib Governorate	1.76	M / M	2
III <u>Moderate development potential, high/moderate population:</u>			
Hamra, At Taffah Nahiya	1.63	L / VH	1
Thool, Yaffi Muderiya	1.62	M / M	1
Dhi Nahim, Dhi Nahim Nahiya	1.54	H / H	2
Doura, Nisab Muderiya	1.50	H / H	1
Al Bayda, Al Bayda Nahiya	1.42	M / M	1
Hatib upper, Yaffi Muderiya	1.38	VH / VH	0
Mukeiras, Lowdar Muderiya	1.33	H / VH	2
IV <u>Moderate/low development potential, low/very low population:</u>			
Hatib lower, Yaffi Muderiya	1.54	L / L	1
As Sawadiyah, As Sawadiya N.	1.50	L / L	1
At Taffah, At Taffah Nahiya	1.50	L / L	1
As Sawmah, As Sawmah Nahiya	1.33	M / L	1
Bayhan upper, Mashwarah Nahiya	1.31	VL / VL	3
Dhi Nakhib, Yaffi Muderiya	1.29	M / M	2
Nati, Nati Nahiya	1.00	VL / VL	0
Mashwara, Mashwara Nahiya	0.96	VL / VL	0

Notes:

- DEV POT is the final score of the development potential in the area.
- Population is presented in number and density.
- Water scope indicates the future potential that availability water combined with water saving techniques may have on increased agricultural productivity.

VL = very low

L = low

M = moderate

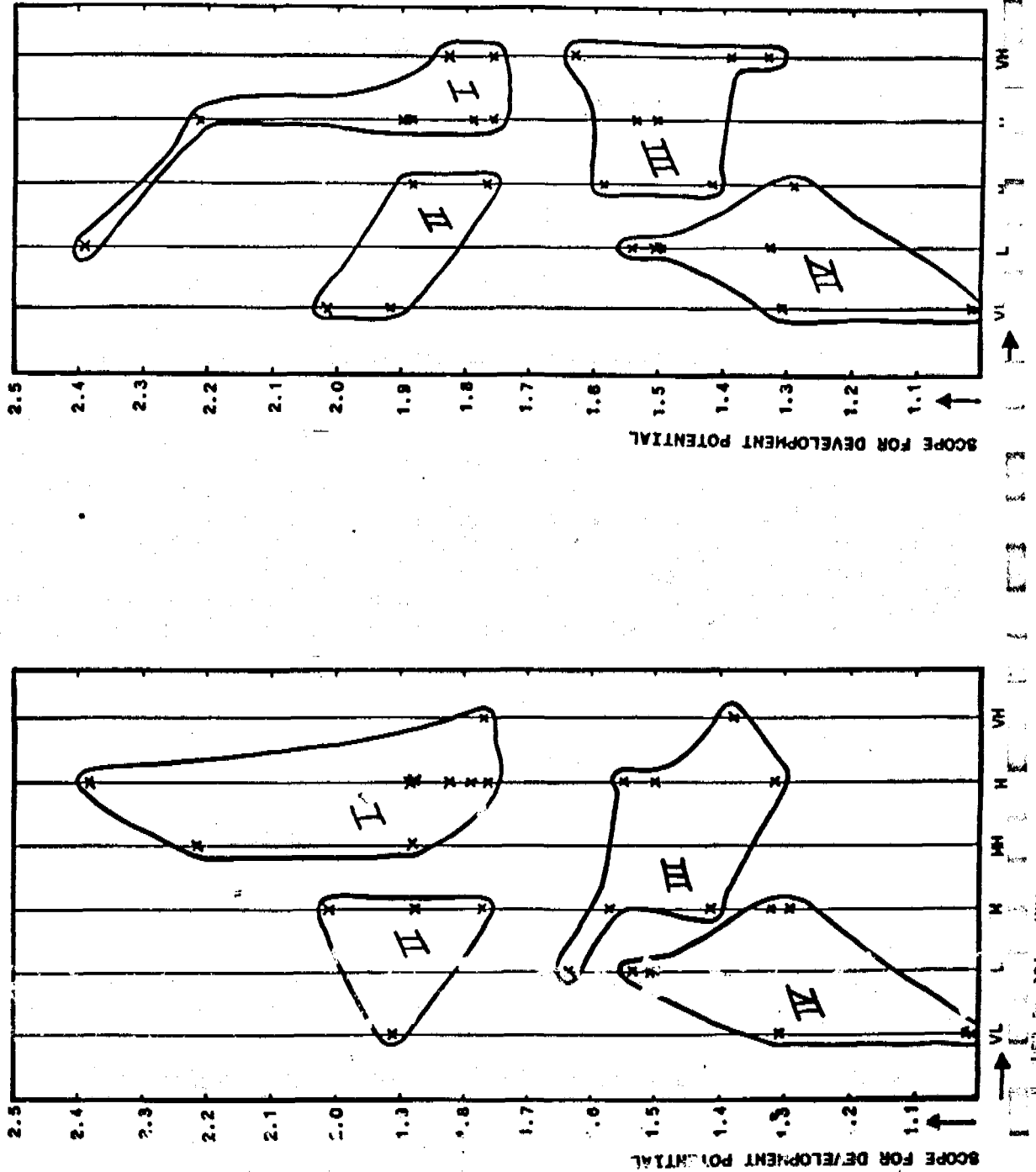
MH = moderately high

H = high

VH = very high

VL - Very Low
 L - Low
 M - Medium
 MH - Medium High
 H - High
 VH - Very High

Figure 4.1: The development potentials of the areas related to population classes for number and density.



4.3 Selection of areas

On the basis of the priority classification, areas with a high potential for future development interventions can be selected. Four areas located in the highest priority class, will not be included. These are the downstream and midstream part of Bayhan, the Habadan area, and Marfad area.

In the two formers, the Bayhan Agricultural Development Project is active since 1982. This project was financed by the World Bank, and other international financing agencies, and the Government of Yemen. The first phase of this project, supervised by the FAO, terminated in December 1988. At present, the preparation of phase 2 takes place. Starting new development interventions in both areas may result in competition between projects.

The Habadan area, will fall outside the study area as it forms not part of the catchment area in Al Bayda province. The Marfad area appears to be very similar to the Maflahi plateau, which is already a selected area.

There are three types of areas to be selected:

- the first priority areas that will be studied in more detail both in the field and on the basis of relevant literature available during phase two of the inventory study (Markha, Khawrah), and on the basis of field inquiries only (Khirr, Yahar, Maflahi);
- the second priority areas that will be studied on the basis of existing relevant literature (Bayhan, Mukairas);
- the other areas that have been quickly surveyed during the first phase of the inventory study.

The study team will not return to the last mentioned areas, but will include the collected information in the final report, as to provide a general overview of the entire study area. This will facilitate authorities to use this information in planning activities and/or to select sectorial oriented development activities or any other projects in smaller or larger geographic areas.

The study team has decided to concentrate its inquiries on areas where information is lacking or very limited. Development interventions in the As Sawadiyah Nahiya, located in Al Bayda district, are already included in the RIRDP Plan of Operations for the period 1990-1992. This means that the RIRDP will collect data and information on As Sawadiyah area. The data and information already collected will form part of the final report of the inventory study. Hence, due to limited time available, the study team will not further concentrate its activities on this Nahiya.

The first priority areas that will be studied in more detail in phase two of the inventory study are:

- the Markha upstream and downstream areas;
- the Khawrah area which forms part of Markha;
- the Khirr area;
- in the Yaffi Muderiya: the Yahar and Maflahi areas.

4.3.1 The Markha area

Although, the Markha downstream area is placed in priority class two, due to its lower population, it has a high development potential. The main reason for its inclusion as priority area is the fact that Markha downstream is part of the Markha catchment area. This area should be treated as one entity, which should not be broken down in various smaller units, which may receive in future different forms of development interventions. The upstream area belongs to both the Shabwa Governorate and the Al Bayda province, the downstream area to the Shabwa Governorate.

Both the upstream and downstream parts of Markha area show a high potential for development. Both areas show potentials for increased agricultural productivity on a sustainable basis, through careful management of the water resources, water saving techniques, irrigated and rainfed agriculture, and the development and strengthening of agricultural input supply and support services. The main aim will be that the present and future population will reach economically self-sufficiency on the basis of agricultural and non-agricultural income generating activities in the area. To this end, the rural women should be allowed to take a more pronounced role in the development activities. Attention should be paid to the fact that development activities should not result in an increase of the actual workload of women. Improvement of the basic social infrastructure will be an important asset to reach this aim.

4.3.2 The Khawrah area

The Khawrah area situated in Nisab Muderiya, is a sidebranch of the Markha wadi and belongs to the Markha area. Khawrah area shows a high potential for development. The agricultural productivity can be raised through careful management of the water resources, water saving techniques, irrigated and rainfed agriculture, livestock production, land conservation measures, and the development or strengthening of agricultural input supply and support services. The main aim will be to become in equilibrium with the carrying capacity of the area, and to maintain an economic self-sufficiency on the basis of agricultural and non-agricultural income generating activities. Improvement of the basic social infrastructure and a more active participation of women in the development process will largely assist in obtaining this aim. However, the actual workload of women has to be taken into consideration as well together with the aim to reduce this workload.

4.3.3 The Khirr area

The Khirr area consists of a wadi situated in the Na'man nahiya (Al Bayda province) and Bayhan muderiya (Shabwa Governorate). The area has a high development potential. The potential to increase agricultural productivity is high and will mainly depend on controlled management of the water resources and water saving techniques for rainfed and irrigated agriculture, improved management of grazing, land conservation and the development and strengthening of agricultural services. The objective for development will be the same as for the Markha area. Improvement of the basic social infrastructure and a more pronounced role of the rural women in the development process, without adding to their workload, form important assets to reach this objective.

4.3.4 The Yahar area

The Yahar area is situated in the Yaffi muderiya and is characterised by a large population number and density. The area shows a large agricultural potential that can be exploited in a similar way as mentioned for the Khawrah area. Special emphasis is required to avoid surpassing of the carrying capacity of the area and to avoid degradation of the land resource base. Soil conservation measures will therefore be important. Concerning the basic social infra-structure and the role of the women in the development process, the same remarks can be made as for the above mentioned areas.

4.3.5 The Maflahi area

The Maflahi area is situated on the plateau in the Yaffi Muderiya. It is a very remote area, rather inaccessible, and very densely populated. The plateau is often intersected by hills. The area has a potential for irrigated and rainfed agriculture, although a limited one, as the resource base is already over-exploited. Moreover, its density and large number of inhabitants make this area a priority one. Careful management of the water resources and the introduction of water saving techniques are therefore required. Furthermore, emphasis should be placed on controlled grazing and land conservation measures. Concerning the basic social infra-structure and the role of the women in the development process, the same remarks can be made as for the above mentioned areas.

REVISIONS



5. THEMATIC STUDIES

5.1 Need for thematic studies

The thematic studies will include the assessment of the land and water resources, and more particular the problem of depletion of water resources, migration, women and development, and the institutional environment. These thematic studies will place the anticipated development perspectives in a broader focus than could have been the case through only a sectorial analysis.

For instance, depletion of groundwater can clearly be assessed by using technical means and monitoring systems. However, these types of measurements will not explain why farmers continue to deplete their precious water resource. This fact is imbedded in strong socio-cultural and economical habits and should therefore carefully be approached. The explosive growth in investment in wells and pumps for irrigation can directly be linked with the migration situation.

Due to the recent large return of migrants, the pressure on land and water resources will strongly increase, making the fragile environment still more vulnerable for over-exploitation. There are not many ways out to maintain an equilibrium between present and future population requirements, and the carrying capacity of this environment. Off-farm employment may be one of the possibilities, as may be the need to officially recognize the rural women as an autonomous economic entity, who can develop income generating activities. No matter how and at what pace this process is moving, it will require a strong institutional frame, to create opportunities for sustainable agriculture, off-farm employment, education and health, and to preserve local skills in the area. It should be stressed explicitly that the recognition of women as an autonomous economic entity should be a main objective itself. It should not be considered as a means only to reach other objectives.

5.2 Water resource management

Good quality water is besides suitable land for agriculture, an important factor in the development of the study area. Therefore assessment of the water resources is one of the main purposes of the study. Groundwater is the only permanent source of water and is abstracted from numerous wells. This water is used as drinking water supply for people and cattle as well as for irrigation. At present, ground water is available without restrictions to anybody who digs or drills a well. Due to the installation of pumps and engines in most of the wells, groundwater is more and more exploited and in many areas already overexploited. Studies including a first estimate of the groundwater potential are available only for the downstream parts of the northern wadis with important agricultural development as far as they lie in former South Yemen and for some of the wadis on the northern plateau.

- Collection of the data and results of all available studies on water resources from the reports available in Aden and Rada is one of the main issues of the thematic study on land and water resources.
- Collection of groundwater data by a limited well inventory on reconnaissance level must give us a first insight in the occurrence of water, the water potential, water quality, water use and the status of

groundwater exploitation in terms of over- or under-exploitation and water quality in study areas not covered by previous studies.

Estimates of the groundwater potential of areas made during previous studies and under the present study are based only on well inventory data and flood measurements made during the short period of the study. However, rainfall is so erratic that only estimates based on long periods of monitoring rainfall and water levels will yield sound estimates of the water potential and the status of exploitation of the area. The availability of long records of monitoring data on rainfall, climate, groundwater levels and floods is essential for the assessment of the water resources of an area and for proper water management

No data on rainfall and floods are available for the southern upper reaches of wadi Bana and for the northern wadis in former North Yemen. Only a very limited monitoring network exists in most of the study area.

- Inventarisation of the availability of data on rainfall, climate, groundwater levels and floods as well as the existing monitoring network will give us insight in the need for extension of the monitoring network which is so essential for proper water management.

Public drinking water schemes have been developed in villages in most of the lower northern wadis in former South Yemen and are also available in the water rich lower southward draining wadis below elevations of 1900m. However many villages on the plateau especially in the southern study area have no adequate drinking water supply system. Here water is collected by hand from shallow wells and carried by women over sometimes considerable distances to the house.

- A general inventarisation of the status of water supply systems in the study area based on visits to all the large towns and an adequate number of villages will give us insight into the present status of water supply, and the need and urgency for the construction of drinking water supply systems on village level in the study area. In villages located at high altitudes on the plateau south of the escarpment attention should be paid to the collection of rainwater on roof tops. This, in order to determine whether this form of rainfall collection could contribute to a solution for the water supply problems in these areas.

Modern drinking water supply systems have been implemented in many of the towns and villages in former South Yemen. However they often cause a health problem due to the total lack of a sewage system or the presence of an inadequate system for the disposal of sewage water. In many of these towns and villages stagnant sewage pools can be found. In one village visited by the project team people told about the occurrence of cholera.

A general inventarisation of:

- . the presence and status of sewage disposal,
- . the awareness of latent health hazards due to water born diseases,
- . garbage disposal in the visited villages;

will give us insight into the present availability and, in combination with the need for water supply systems, in the need for proper sewage and garbage disposal systems in the villages and towns in the study area.

5.3 Agricultural zoning

Agricultural zoning is not a thematic study in itself, but it will largely support the sectorial and thematic studies. Moreover, it will be a strong tool for planning and programming of interventions. Maps showing the agricultural zoning in the study area are rare. The ones existing for lower Markha and Nisab areas appear certainly very helpful. In the next phase, more emphasis will be placed on mapping of agricultural zones at a suitable scale.

Based on the reports on Markha and Nisab areas, and the field surveys made so far, a schematic presentation of the different land types and their land use can be given (Figure 5.1). The most common land types are the plateaus and the seasonal river valleys (wadi's). The plateaus show sometimes flat or hilly features, alternating with valleys, some arable land, rangelands and rock outcrops. The main features of the wadi's are the terraces, the wadi bed, and the seasonal stream. The terraces can abruptly end in denuded hills and mountains.

Rangelands

In general the rangelands are located in between the plateaus and the wadi's. The rangelands form rather homogeneous entities with hardly any agricultural potential. These areas are scarcely populated, mainly by nomads, and are dominantly used for grazing of livestock. The accessibility of rangelands is generally poor. The basic social infrastructure in these areas is often weakly developed.

Plateaus

The topography of the plateaus varies from gently sloping to very hilly. Rainfed agriculture is often limited and irrigated agriculture very limited. As a result, the agricultural potential might be variable. Especially when the plateau is densely populated, the land and water resources might quickly be over-exploited. Accessibility and basic social infrastructure are largely determined by the physiography of the plateau.

Valleys

The most upstream parts of the wadi's do not have a real wadi bed in which occasionally water flows. These units are named valleys. The geographically small valleys, which occur in between the plateaus, are mostly dry. The agricultural potential is generally low, except for those places where groundwater is not deep under the surface. The opportunity for rainfed and/or irrigated agriculture is therefore related to the occurrence of groundwater. Accessibility is often poor.

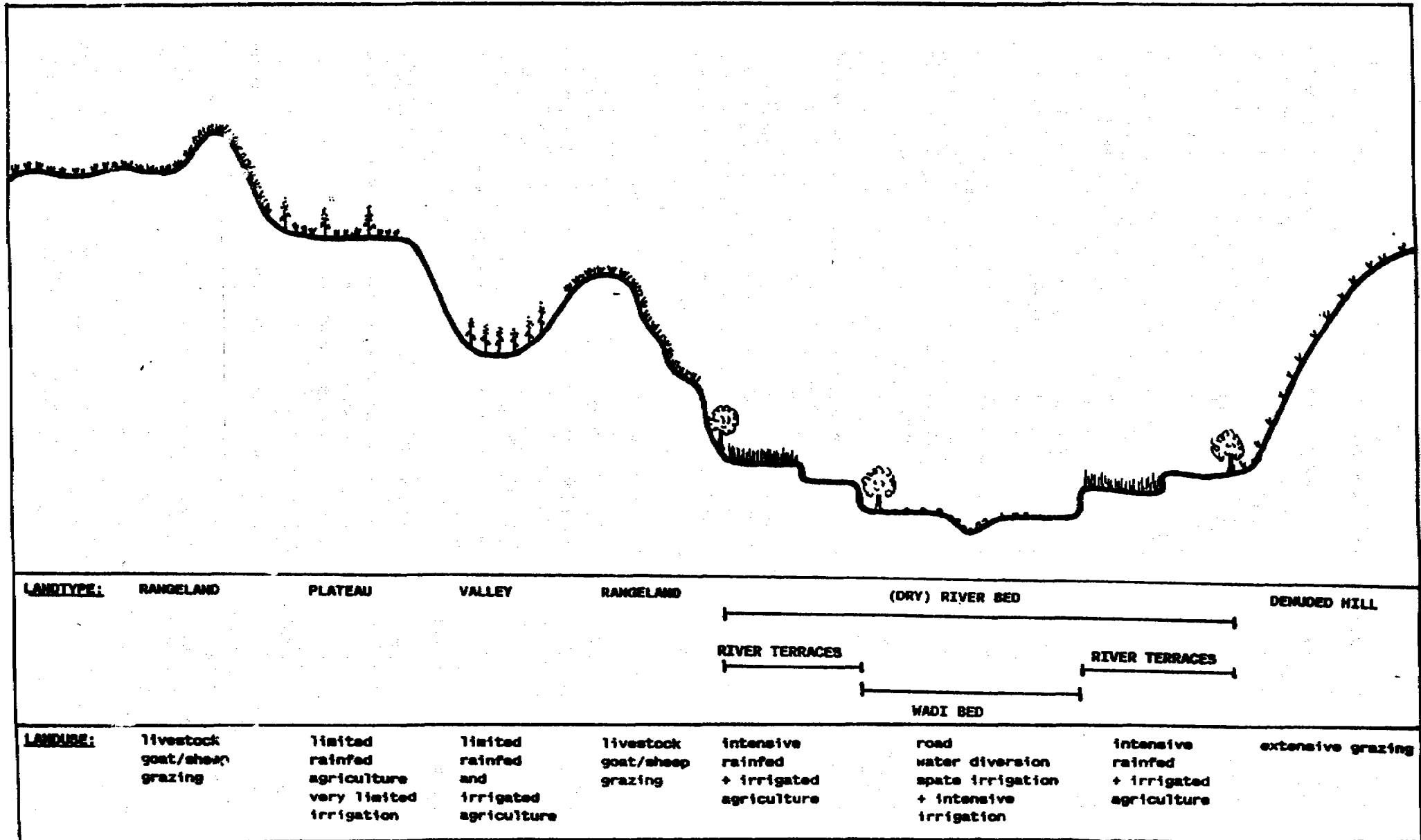
Wadi's

The main landforms in between the plateaus are the wadi's. The wadi's can be divided into two units: the river terraces, and the actual wadi bed. Together these two units are also considered as river bed.

Terraces

The river terraces, which developed due to human influence over a long time, have a large scope for intensive rainfed and irrigated agriculture. The terraces are often densely populated. Crop diversification is generally practiced and includes various kinds of food crops, vegetables, and fruits. Due to the availability of byproducts and irrigated fodder crops as cash crop, the livestock component appears to be reasonably viable.

Figure 5.1: Schematic presentation of landtypes and landuse.



River beds

The river bed is often used for rainfed but also for irrigated agriculture. Water diversion systems, if present, provide scope for rainfed food crops and some temporary grazing. Sometimes, intensive irrigated agriculture is practiced, however, most agricultural systems are based on spate irrigation. The wadi bed itself is generally used as road.

The above schematic presentation differs from a longitudinal profile of the wadi valley which is described below.

The upstream part of the wadi dissects the plateaus generally deeply. The terraces, bordering the steep slopes, are clearly visible and located at various levels. The wadi bed is mainly built up of very coarse material and boulders. During large floods the fine textured materials can sedimentate on the terraces, due to irrigation measures, thereby maintaining the natural fertility of the terraces. Most terraces have a good workability and are suitable for a large variety of crops. Often the terraces are completely used for intensive irrigated and rainfed cropping.

The midstream part of the wadi shows meandering features and a broadening of the wadi bed, with less coarse materials in the stream bed. The terraces are still intensively used for irrigated and rainfed agriculture. Irrigation takes also place in the lower parts of the river valley, and even in the wadi bed.

The downstream part often shows sedimentation of gravel and finer materials. The wadi bed is very wide with strong meandering features. The agricultural activities take place on the ancient terraces which are often not well maintained. Rainfed agriculture is limited, sometimes completely absent. Irrigated agriculture (mainly vegetables and other cash crops), often occurs on a limited scale in the lower parts of the wadi bed. Soils and the often scarce vegetation may indicate a high salinity. Sometimes, the downstream part of wadi's which flow into the sand desert, is strongly influenced by wind erosion, and is sometimes completely deserted.

It will be clear that the possibilities for agriculture in the downstream part of the wadi are completely dependent on good water management and regulation in the mid and upstream parts. Extension and intensification of irrigated agriculture on the upstream terraces will reduce the possibilities for irrigated agriculture in the lower downstream parts. Besides over-exploitation of the water resources in the upstream areas resulting in limited or poor water availability in the downstream areas, the latter will be further punished by increasing salinity problems. Control of water resources, a good water management and water saving techniques are the means to create equal conditions and opportunities for the entire wadi. In phase two of the inventory study, these aspects will receive special attention. Questions on availability and use of groundwater, water harvesting and trends in landuse and water shortage are included in the questionnaire.

5.4 Women impact assessment

Women and development is one of the thematic studies that will be included in the inventory. Through a women impact assessment, with the Rada

situation as a reference, this theme will be worked out for the study area in phase two. During phase one of the inventory study, insight in the actual activities of the rural women extension section in the RIRD area has been obtained. At the end of phase one, this has resulted in the preparation of a special questionnaire directed at women's role and workload in agriculture, livestock, and water supply (see Annex D). Other subjects that will be covered in the questionnaires are sanitation, education, mobility of women and the effect of migration.

5.5 Migration and off-farm employment

The pressure on land and water resources will strongly increase, due to the return of migrants from the Gulf area. In principle, the returning migrants have to report to their home village or area. This trend may have important repercussions for agricultural areas. Some areas are already over-exploited and will not offer employment opportunities in agriculture. This may result in migration to large population centres. Consequently, local skills and educational experience will become deluted for the areas that really need these skills. During the quick field surveys carried out in the first phase, the migration aspect was frequently met.

During phase two of the study, emphasis will be placed on the migration and off-farm employment aspect. Questions on migration are included in the questionnaire on women and development, and in the questions related to population number and density in the priority areas. For the thematic part, a special questionnaire has been developed. This questionnaire will mainly be used in areas with a reported high migration rate, such as the Yaffi area (Muflahi and Yahar), and upper Markha. The theme will mainly focus on land properties of the migrant, remittances, employment opportunities, and caretaking of house and fields when the migrant is abroad.

5.6 Institutional environment

5.6.1 Levels of authority

Between national and grassroot level, a number of government administrations and development institutions make up the government structure. This structure is strongly schematized with the Ministry of Agriculture and Water Resources as example:

National level:

1. Ministry of Agriculture and Water Resources (MAWR)
2. General Department for Agricultural Extension and Training (GD/AET)
Confederation of Yemen Development Associations (CYDA)

Provincial level:

3. Governor Office
4. Development authorities
5. Project authorities, or
- 5a/6. Provincial agricultural office
7. Technical sections
Coordinating Council for LCCD's (CC)

District level:

8. Districts authority
Local development authorities

Subdistrict level (Nahiyah/Muderiya):

9. Subdistrict authorities, and
10. Local Authorities for development (LCCD's, etc.)

Village level:

11. Village authorities/leaders
12. Farmers associations and co-operatives
13. Contact farmer
14. Rural household/farmer

For simplification, only 14 possible and different levels are shown.

5.6.2 Place of development interventions

Development interventions need to be placed at a certain hierarchical level in such a way, that it can fulfil the following conditions:

- be implemented, managed and controlled by the beneficiaries on a sustainable basis;
- be controlled and administered by the local authorities;
- be sanctioned by the authorities at the national level.

It is possible to distinguish various types of development interventions, from which the most common are:

- intervention I: controlled at the national level;
- intervention II: controlled at the provincial or district levels;
- intervention III: controlled at the village level.

In the first case, interventions are implemented, managed and controlled at the national level. The intervention itself is directed to and should serve the village level and individual households. Often such an intervention is obstructed at the provincial and district levels. Not seldom at these levels, control and administration is weak, while the offices are understaffed, compete and show various forms of insufficient or inadequate communication.

In the last case, interventions are implemented, managed and controlled by the local population, controlled and administered by the village authorities, and sometimes sanctioned by district authorities. These types of local initiatives often lack the financial power as well as the support at the provincial and national level.

Interventions controlled at the provincial or district level are often the most complicated ones as management, control, administration and financial support may come from completely different levels.

Development interventions controlled by various ministries at the same time, have always in common that they are never up to expectations. Implementation, control and management are inadequate as the objectives and individual responsibilities of each ministry with regard to the intervention are seldom clearly described.

5.6.3 Communication

One of the most important elements for development interventions is communication. In the case of intervention I, communication at the national level is relatively simple. In the above presented schematic approach, this concerns decisive communication between level 1 and 2 only. However, the communication line towards the beneficiaries is very long and may include all the steps down from 2 to 14. Most likely with each step, this communication is slowing down, more scattered, and may become increasingly wired to individual interests. When financial resources are directly channelled to a much lower hierarchical level, various higher levels may feel bypassed and reluctant to cooperate.

Communication in the case of intervention III often is quite effective at the local and village level (levels 10-14). However, communication upwards is highly elaborative, as this always must follow all hierarchical levels through committee representatives. It is relatively easy to obstruct the intended communication upwards, as each higher level becomes more powerful to control, adjust, or abort the information flow.

When the development interventions should take place at the district or provincial level (intervention II), communication is often quite complex. The line upwards is relatively long (from level 4-7 to 1 and 2), but also the line downwards is long. Communication is highly time consuming and only possible when all levels are co-operative. The subdistrict and district level authorities and development institutions are well aware of development possibilities and the requirements of the rural population. The provincial levels communicating with national and district authorities are well aware of both local development potentials and needs, and of the policies, national priorities, rules and regulations authorised at the national level.

Development interventions partially or completely relying on external inputs are often hampered by complex administrative matters and long bureaucratic communication systems. Communication and international orders have to pass more than once the technical ministry, foreign affairs, planning ministry, and last but not least the customs system.

5.6.4 Institution building

Utilization of the potential for development interventions requires a strong institutional environment. For the study area and priority areas this should be interpreted as development and/or strengthening of:

- organizational entities;
- the existing institutional frame;
- local capacities.

Organizational development

Information on the possibilities for strengthening of coordination, administration, planning and other tasks at the local level (LCCD's, etc.), subdistrict and district level will be collected.

Institutional development

Information on possibilities for improvement of institutional dimensions at local, subdistrict and district level within the national outline of

policies, and with a focus on lines of communication and services, will be gathered.

Local capacity building

Information on possible means to establish and strengthen the local capacity to deal with possible future development interventions, will be collected.

The aspect of the institutional environment is included in a special questionnaire. Its main purpose is to gain information on the contacts and communication between the rural population and local authorities, and the capacity and capability of these authorities to translate this information flow into action.

6. COMPARATIVE SECTOR PERFORMANCE

The subject on comparative sector performance entered the terms of reference at a moment that the quick surveys were already implemented in the different parts of the study area. The need to include this comparative element is obvious. To this end the results from the census of 1986 have been used to compare field information with census data. Furthermore, the census results concerning only the Al Bayda province have been ordered.

Informal contacts have been made with the section responsible for the census on housing and population of the former Central Planning Office, which at present is transformed into the Central Statistical Organisation. A formal request will be made to obtain some selected information. During phase two, this information will be used to compare field data obtained from the study area with other areas and with the national level in Yemen.

With respect to the comparative sector performance, information focussing on the international norms on health, housing and education used by UNESCO and WHO, will be gathered.

7. PREPARATION OF PHASE II

7.1 Objectives of phase II

The objectives of phase II are:

- to study in more detail the selected subjects in the first priority areas;
- to study the second priority areas on the basis of existing relevant literature;
- to fill in major gaps in information;
- to compare, on the basis of social parameters, the first priority areas with other areas and with the national level;
- to review and assess the methodology used, by means of a workshop at the end of phase two.

7.2 Methodology

The first priority areas will be studied in more detail by means of questionnaires directed to different levels of target respondents and occasionally by means of semi-structured interviews. The questionnaires will generate information on the sectorial subjects, the thematic subjects, and some optional subjects. In addition, information will be collected on subjects from which data is lacking, references which are mainly sectorial oriented will be studied, and data will be processed. Details on the methodology are reflected in the work plan.

Main subjects to be covered

The main subjects to be covered are water and wells (WELL), agriculture (AGRIC), women and development (WAD), and migration (MIG). A main questionnaire only deals with one main subject. Hence, four main questionnaires will be developed.

Thematic studies

In order to generate sufficient information on the thematic studies, questions related to these themes are included in the questionnaires. The objectives of these themes are reflected in the objectives of the specific questionnaire.

Optional subjects

In order to use special opportunities but within the time frame envisaged, optional subjects can be included in the field survey. For example, the opportunity may arise to visit markets, to collect first-hand information on land tenure and sharecropping, land conservation and water diversion systems, communal self-help systems. It is also possible that after a stay of a few days in a priority area, one selected village can be studied in more detail.

Main objectives of the questionnaires

The main objective of the WELL questionnaire is to gain insight in the hydrology of the area and the quality of water, both in space and time.

The main objective of the AGRIC questionnaire is to gain insight in the land resources, the level of agricultural development including services and

the main agricultural systems, and any changes in these aspects observed since the last years.

The main objective of the WAD questionnaire is to determine the role and workload of women in agriculture, livestock, and water supply (see Annex D). Other subjects that will be covered in the questionnaire are sanitation, education, mobility of women and the effect of migration of their husbands.

The main objective of the MIG questionnaire is to generate information on the situation of the returning emigrant, his possibilities for new employment, and on the effect of his (former) departure on the women's workload. The MIG questionnaire will be used in the selected priority areas with a high migration rate, such as Maflahi in Yaffi muderiya and upper Markha in Markha nahiya.

For the assessment of the institutional environment, also a questionnaire has been developed. This one will be used at village level (for example for co-operatives, marketing, agricultural services) as well as at higher levels to address agricultural extension and research, commercial and credit systems and facilities, training and education, administration and communication. Its main objective is to gain information on contacts and communication between the rural population and the local, provincial and national authorities. On the basis of the information collected through this questionnaire, provincial and national authorities will be interviewed.

Selection of target groups for the surveys

The field surveys will be directed to four different levels:

- the individual household level;
- the village level;
- the subdistrict and district level;
- the provincial and national level.

At the individual household level, the target groups will be women and male farmers. During the afternoon, groups of male farmers can be reached through qat session interviews. The target group at the village level will be the prominent people of the village, such as the local authorities for development (LCCD's), teachers, police officers, english speaking persons, and any other important person in the rural community. At the subdistrict and district level, representatives of the ministries, district officials, and doctors will be contacted. At the higher level, information can be gathered at the governors' office, the provincial councils, banks and commercial centres, the agricultural research and extension authority (AREA). Nevertheless, the most important levels are the household and the village level.

Consequently, different questionnaires will be used for different target groups, while the level of the questionnaires should correspond with the level of the target groups. A few cross checks will be built in, to compare answers obtained at different levels.

The orientation of the questionnaire

At the reconnaissance level, it will be important to spot possible limitations and potentials for development interventions, as well as trends observed by the respondents during the last years. At the inventory level it will not be attempted to investigate possible solutions for problems or limitations reported by the respondents. The ultimate goal will be to describe the present situation and existing trends at village level as accurate as

possible, as this should later serve as the basis for programming of future possible interventions.

Since the information and data base is weak, preference is given to the qualitative content of the questionnaires. Only when it is sure that the information obtained can be checked immediately on the spot, the quantitative content will form part of the questionnaire. Where possible and mainly at the lower level, closed questions of the yes/no type will be used, and if the answer is "yes", a little more information will be collected, avoiding too much details. The limiting factor in the open-ended questions is the difficulty to set up a computerized data bank combined with the time factor.

Matching of subject with questionnaire and level

The four main subjects are principally meant for the two main levels, household and village level. However, the subject water and migration will cover all levels. The WAD questionnaire will mainly be used at household level.

The subject water will be separated into three different aspects: domestic use including sanitation, agricultural use, and availability aspects. Questions related to domestic use and sanitation will be included in the WAD and partially in the WELL questionnaire. Water for agricultural use will be included in the AGRIC and partially in the WELL questionnaire, and water availability in the WELL questionnaire.

Questions on migration will appear in the MIG questionnaire, but also some questions on migration will be included in the WAD questionnaire for both women and emigrants.

The main questionnaires may comprise more than one part. Each part may refer to one of the levels of respondents. One part of the questionnaire should be filled in by the interviewer on the basis of personal observations, while other parts will be confined to the interview of a single person, a group of persons, or a prominent person.

Major data gaps

During phase II of the study, it will be necessary to fill in major gaps in information on population number and density, and the extent of the catchment areas and groundwater resources and the extension of arable land. Through a work division, one of the field team members dealing with the WELL questionnaire will include these aspects.

Literature survey

During phase I of the study, an attempt has been made to collect relevant reports on the study area. Various reports are available in Aden, Rada and Sana'a. Approximately one week will be reserved in phase II to complete this literature survey and to collect, if available, additional existing maps and aerial photography.

Data processing

Data processing will be a key element in phase II. The data will be entered in Lotus, which is compatible with the GIS system (Atlas graphics). The information resulting from the thematic studies and the thematic parts of the questionnaires will be entered in the data base for GIS as far as they can be entered in a quantitative way.

7.3 Implementation

The main keys regarding the work division are time and area. The field work in the three main areas Markha, Khirr and Yaffi will comprise approximately 32 field days. The time required per area is roughly 15 days for Markha, 10 days for Yaffi, and 5 days for Khirr. The study team will be split up into three units which will operate separately in the subregions of these areas. Table 7.1 shows the tentative division of unitdays per area, level of target group and subject. 1 unit day means that one unit will spend one day on a certain subject in the area.

One unit will use all time for the subject women and development, and interviews with female teachers and nurses (if present). One other unit will use the AGRIC questionnaire for various levels of target groups, while the third unit will devote its time to the WELL questionnaire, the filling of major data gaps, and some optional subjects. The MIG questionnaire will be used in the Yaffi an upper Markha areas. Special time will be allocated to the institutional and MIG subjects.

Table 7.1 - The tentative division of unitdays per area

region		MARKHA			YAFFI		BAYHAN
subregion		upper	lower	Khawrah	Maflahi	Yahar	Khirr
subject	unitdays	13	11	12	12	12	12
<u>household level</u>							
.women and developm.		3½	3½	3½	3½	3½	3½
.agriculture		2	2	2	1	1	2
.migration		1	-	-	2	2	-
<u>village level</u>							
.population		1	1	1	1½	1	1
.agriculture		2	2	2	1	1½	2
.well		2	1	2	2	2	2
<u>local/regional level</u>							
.institutional env.		-	-	-	-	-	-
.schools/clinics		½	½	½	½	½	½
.suq's		½	½	½	½	½	½
<u>provinc/nation. level</u>							
.institutional env.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<u>optional subjects</u>							
.off-farm activities							
.cooperatives				½			½
.nomads		½	½				
.water harvest syst.							
.water division syst.							
.land conservation							
.soil samples							
.mapping land use							

ANNEX A

**Study proposal, May 1990
Updated study proposal, November 1990
Interpretation of terms of reference
for the women impact assessment**

Yemen Arab Republic
Ministry of Agriculture
and Fisheries

Kingdom of The Netherlands
Ministry of Foreign Affairs
Development Cooperation
(Asia) Department

RADA INTEGRATED RURAL DEVELOPMENT PROJECT

**PERSPECTIVES FOR RURAL DEVELOPMENT
IN AL BAYDA PROVINCE**

STUDY PROPOSAL

4.08.046

May 1990

**Ilaco
Arnhem, The Netherlands**

1 INTRODUCTION

1.1 Background

Al Bayda Province lies in the south-eastern part of the Yemen Arab Republic. It covers a mountainous area of approximately 11 000 km² and it has a resident population of about 380 000 (1986 census). The economy is based on, mainly rainfed, agriculture. There is no known mineral wealth in the area; industry has hardly developed. The province has a long history of migration dating back to the beginning of this century. The area is connected to the main north-south axis by the Dhamar-Rada-Al Bayda asphalt road, and a number of feeder roads connecting major population areas to this road. However, large parts of the province are only accessible by tracks with many bottlenecks. Health, education and other social services are still at a low level and lagging behind national averages per capita.

The area is arid to semi-arid, the average annual rainfall being 200 to 350 mm. Surface water resources are very limited. There are no rivers, although there are a few small perennial streams in the south of Rada District. Small dams are found throughout the area; many have silted up and only a few are still in operation. Traditionally, water for the supply of drinking-water and for irrigation has come from numerous dug wells and a number of springs. In the past decade, there has been a rapid increase in groundwater exploitation by deep tubewells, both for domestic water supply and irrigation. As a result, groundwater levels are dropping and there is a real danger of exhausting existing water supplies from deeper lying aquifers in a number of areas.

Since 1977, the Rada Integrated Rural Development Project (RIRDP) has been active in the area. Present activities include road construction and maintenance, domestic water supply and sanitation, livestock, agriculture and extension, land and water conservation, women participation programmes and hydrological studies. The project is financed jointly by the Governments of the Yemen Arab Republic and the Netherlands.

The focus of the project has so far been on Rada District, which covers roughly one-third of the province, but it is intended that in the period 1990-1992, the project will extend its activities to other areas of the province. Indeed, a start has already been made with the road construction, land and water conservation, agricultural and water supply programmes. As suggested in the Joint Yemen-Netherlands Evaluation Mission Report (August 1989) and elaborated in the RIRDP's Plan of Operations 1990-1992 (December 1989) a study is necessary to identify the most promising areas in terms of development opportunities and to gauge the development priorities of the rural population. The results of this study would guide the extension of the project activities and set priorities for project interventions. At the same time, such an inventory of potential and needs would provide a basis for planning follow-up programmes and activities beyond 1992, and the role the Netherlands Assistance Programme could play therein.

The following sections provide the proposal for the study. They outline the basic strategy, scope and components of the study as well as its phasing, staff input and organization.

1.2 Institutional framework

The Rada Integrated Rural Development Project. The study will be carried out under the auspices of the RIRDP. The project has four staff units: a) Finance, b) Administration, c) Planning, monitoring and evaluation (PME) and d) Information. The executive sections include: a) Agriculture and Al Khabar farm, b) Maintenance, c) Roads and Land and Water Conservation, d) Engineering (water supply, geohydrology and sanitation), e) Rural Women Extension, f) Livestock and g) Agricultural Extension. The General Manager of the project is assisted by a Technical Assistance Unit (TAU).

The RIRDP falls under the responsibility of the Ministry of Agriculture and Fisheries (MoA) and more specifically under the Integrated Rural Project Department.

The RIRDP is the sole agent of MoA in Al Bayda Province (the small office in the provincial capital has been put under the umbrella of the RIRDP) and as such regarded by the Ministry as its executive regional branch.

The Governorate. The Governor's office and those of the Nahiyahs (sub-district) are mainly concerned with interior and judiciary affairs, development activities being left to the Local Councils for Cooperative Development (LCCD, see below). In addition, many ministries have an office in Al Bayda town and some (Education and Finance) also in Rada town, but their capacity is small and their activities bear no direct relationship to those carried out by the RIRDP.

The exception is the Ministry of Public Works which is represented in the province by the Highway Authority. This body is in charge of the main roads in the area. The Authority has offices in Al Bayda and Rada, from which it maintains the tarred road leading from Dhamar to Al Bayda and the gravel road from Rada to Juban.

LCCD's and villages. Most contacts between the project and the population are channeled through LCCD's or direct through village leaders. There are 16 LCCD's in Al Bayda Province. They originate from the Local Development Authorities and coincide with the boundaries of a sub-district. The LCCD consists of an assembly of officials appointed by Government and elected representatives from each village in its area, out of which a board of 5 to 7 members is chosen. The board holds office for three years; three functions (president, treasurer and secretary) carry a salary. At the provincial level, the LCCD's are represented in the Coordinating Council. This council, but also the individual LCCD's, have direct access to the national body, the Confederation of Yemen Development Associations. The LCCD's are financed from various sources: donations from the national board and provincial council, direct contribution by villages and from Zakkat (religious tax) funds.

Map 1 represents the boundaries of the 16 LCCD's in Al Bayda Province and the boundary of the province and the two districts Rada and Al Bayda.

2

STRATEGY AND OBJECTIVES

In the last few years, the project has been facing two main issues:

- the need to expand project activities to areas outside Rada District so as to bring about a more balanced contribution of the project to the entire province, and
- to identify follow-up activities for the period beyond 1992 when the project in its present form will come to an end.

The expansion of project activities to Al Bayda District is no longer an issue of discussion. In fact there has already been a shift of some of the activities. The 1989 Evaluation Mission estimated that roughly 10% of the agricultural extension activities were taken place in Al Bayda District; corresponding proportions in water supply, roads and land and water conservation are 35%, 65% and 35%, respectively. There are also advanced plans to construct a substation in Al Bayda.

While the expansion of activities is no longer in dispute, there is considerable uncertainty as to its extent. Project funds and implementation capacity are limited. Furthermore, project activities are at various stages of maturity and thus of readiness to be expanded. For the latter reason, it has been decided beforehand to confine Rural Women Extension and Sanitation to Rada District for the time being. The other project activities, however, are considered to be fit for expansion. The strategy of the study is to take inventory of the spatial distribution of development potential and needs in the province and define, in close conjunction with project staff and local authorities, selection criteria which will enable the identification of priority areas for project expansion. In doing this, due recognition should be given to the limitations posed by the 1990-1992 Plan of Operations.

The inventory will include an assessment of the distribution of agricultural land and rangelands and water as well as the distribution of population and basic infrastructure such as schools, health centres, water supply and roads. This information will be of sufficient depth to allow for the identification at reconnaissance level of priority programmes to be undertaken beyond 1992. The inventory will be designed in such a way that a skeleton planning framework is provided for future, more elaborate, regional planning.

Two important issues the study will have to address are how to deal with the problem of the depletion of water resources, and as a result the possible acceleration of migration, in certain areas of the province; and the weak planning capacity at provincial and LCCD levels. The study will formulate and carry out thematic studies to identify indicative development programmes in these fields.

Thus, the objectives of the study can be summarized as follows:

- a) to provide an inventory of development potential and needs in Al Bayda Province;
- b) to prepare a programme for the extension of project activities outside Rada District for the period up to 1992;
- c) to prepare an indicative programme for follow-up activities beyond 1992;
- d) to set up a framework and data base for future regional planning.

3 PHASES AND COMPONENTS OF THE STUDY

The project will be implemented over 6 months in three phases:

- Phase 1: data review and assessment, preparation of basic maps and identification of ranking criteria (1 month).
- Phase 2: field surveys including visits to all LCCD's; thematic studies; selection of priority areas and preparation of a programme for the extension of project activities up to 1992 (3.5 months).
- Phase 3: preparation of an indicative programme for activities beyond 1992 and preparation of the final report (1.5 month).

3.1 Review and assessment

Present project activities. The distribution of present project activities are indicated on a map (scale about 1:62 500) and stored in a data bank (spreadsheet) which provides co-ordinates and basic features. The study will update this information and produce 1:100 000 scale maps showing the location of the various activities in the whole province.

Agricultural zoning. In 1983/84 (ref. 2) and 1986 (ref. 3), studies have been carried out on the land and water resources of Al Bayda Province. Irrigable and actually irrigated lands are indicated on 1:50 000 maps. The present study will update the assessment of the agricultural potential on the basis of satellite imagery, rainfall and other water related data provided by the project, and short field checks. It will subdivide the province in zones (wadi's and subcatchments) indicating for each zone irrigable land, rainfed land and rangelands, and develop a scoring to differentiate the agricultural potential between the zones. The focus will subsequently be narrowed by including other criteria for subzoning such as major crops grown, accessibility and relative importance of livestock production.

Population. On the basis of the 1986 National Census and RIRDP statistics (ref. 2) a 1:100 000 map of the distribution of the population will be prepared, at least to the detail of the agricultural zones.

Water supply and sanitation. An extensive study on the water supply and sanitation conditions in the province was carried out in 1983 and 1984 (ref. 2). In total, 178 villages were covered. The present study will review these data and delineate priority areas for water supply and sanitation. It is believed that the general conditions have not changed much since 1984, except for areas where the project has been active. However, short surveys will be undertaken in the second phase of this study to check this assumption and fill in major data gaps.

Roads. On the basis of existing maps, satellite imagery and RIRDP data, the study will prepare a road map 1:100 000, indicating main settlements, the main road system, feeder roads and major village roads.

Social services. In order to obtain a measure of the level and distribution of social services in the rural areas of the province, the study will collect data on educational and health facilities. The distribution of school and health clinics will be indicated on a 1:100 000 map. Data will also be collected on the quality of the services, e.g.

number of teachers and students, class attendance. Available data will be checked on accuracy through sample field visits in phase 2 of the study.

Defining selection criteria. The study will define no more than 5 criteria for prioritizing areas for the extension of project activities. These are likely to include: i) agricultural potential, ii) number and density of population, iii) water supply conditions and iv) accessibility. In consultation with the Governor of Al Bayda Province and the provincial Union of LCCD's one more criterion might be established, which would require additional data collection during phase 2.

3.2 Surveys and the preparation of a programme for the extension of project activities

Surveys. During phase 2, field surveys will be conducted including survey design and sampling, preparation and testing of questionnaires and data collection, processing and analysis. The following surveys are foreseen:

- a) short surveys to fill in major data gaps identified in the first phase of the study;
- b) surveys of LCCD's:
 - to gauge their opinion on development prospects and needs as well as on development priorities;
 - to study the functioning of the LCCD with regard to planning and implementation capacity and its relationship to the project; and determine training and other requirements;
 - to establish a programme for follow-up activities;
- c) migration study. Sample survey in selected areas:
 - to determine trends and causes of migration;
 - to establish an indicative programme for follow-up activities beyond 1992;
- d) other surveys to be identified in phase 1 of the study.

Programme for the extension of project activities. The study will distinguish by means of a simple scoring and ranking methodology the priority areas outside Rada District in which each of the proposed project activities should take place. These activities include: i) nurseries, ii) agricultural extension and extension centres, iii) livestock extension and veterinary services, iv) road construction and maintenance, v) land and water conservation, and vi) water supply systems.

The criteria to be used are given in section 3.1. The relative importance of the criteria will be established in conjunction with project staff and the Governor/Union of LCCD's.

The final selection of the location of project activities will take place in consultation with the RIRD staff, taking into account: i) secondary selection criteria as developed by the RIRD (ref. 9 and 11), ii) on-going activities and iii) potential synergy between project activities. Subsequently a work programme up to the end of 1992 will be drawn up.

3.3 Preparation of an indicative programme for follow-up activities beyond 1992 and final reporting

On the basis of the results of the inventory and surveys conducted in the first two phases, the study will identify activities that

may be taken up for implementation in the period beyond 1992. The planning horizon will be the year 2000. It is not the intention to formulate an integrated rural development programme nor a regional development plan. Rather the study will identify and prioritize free standing activities, covering one aspect, which can be taken up separately by the Yemen authorities for application of donor assistance. For the most these activities will require further (feasibility) studies before implementation.

The study team will also propose activities on issues which, during the course of the study, they have identified to have special importance. The process of unification with South Yemen is in an advanced stage and one issue that is likely to rise is the scope of extending the area of impact of the project across the borders of Al Bayda Province. Thus, a variety of activities will be possible:

- a) further intensification and expansion of project activities in Al Bayda Province in accordance with the priority programme formulated in phase 2;
- b) new activities resulting from the recommendations of the LCCD and migration studies (see section 3.2);
- c) new activities arising from the inventory of LCCDs' development priorities;
- d) new activities relating to issues identified by the study team during the course of the study.

The study will formulate in conjunction with the Governor, the MoA, Central Planning Organization (CPO) and other relevant Yemeni authorities and Netherlands authorities a tentative priority programme. To facilitate the decision making, it is proposed to hold a workshop with all relevant parties participating. The scope and mechanism of such a workshop will be worked out during the study.

Final reporting and mapping will take place in the Netherlands.

3.4 Planning system

The study will set up a computerized data base system and geographic information system (G.I.S.) that is compatible with other systems in YAR and suitable for future regional planning. Project counterpart staff will be trained in the use of the system.

4 ORGANIZATION AND STAFFING

The study will be carried out by Ilaco in association with the Department of Geography of Developing Countries, University of Utrecht, and the Sana'a University, under the auspices of RIRDP and will maintain close links with the sections of the project. The direct counterpart organization will be the Planning, Monitoring and Evaluation section which will provide the liaison between study team and the project, the MoA, the Governor, the LCCD's and other Yemen authorities. The Head of the Section will be the counterpart to the study team leader and participate in the study on a part-time basis. The technical adviser of the section will also participate part-time, while one member of the section will be assigned to the study on a full-time basis.

The composition of the study team is as follows:

- a sociologist/rural development planner (team leader)
(Mr. E. Prowizur);
- an agricultural planner
(Ms. C. Hoisington);
- a water resources planner
(Mr. W. Boehmer);
- a senior regional planner
(Mr. H. Floor);
- three junior regional planners/geographers
(to be identified);
- three Yemeni assistant geographers
(to be identified).

The staffing schedule is presented in figure 1. The main tasks and responsibilities of each team member are summarized below.

Team leader.

- co-ordinate and supervise the activities of the other team members;
- guide the PME section in collecting existing data;
- plan and guide the field surveys;
- represent the study team in meetings with Yemen authorities;
- design and conduct the thematic studies;
- draft the priority and indicative programmes;
- report regularly on progress of the study to project management;
- final reporting.

Agricultural planner.

- prepare the agricultural zoning;
- establish the ranking and selection system, in conjunction with the team leader and senior regional planner;
- participate in field surveys;
- assist in drafting the priority and indicative programmes;
- assist in final reporting.

Water resources planner.

- review and assess available (geo-) hydrological data;
- prepare surveys for filling in data gaps;
- assist in preparing the agricultural zoning;
- provide backstopping.

Senior regional planner.

- guide the junior regional planners;
- advise on planning and execution of the field surveys and the processing and evaluation of data;
- advise on computer processing of data and supervise the preparation of maps and tables at the head office;
- advise on the ranking and selection methodology;
- provide backstopping to the junior regional planners.

Junior regional planners.

- assist in preparation of a data base and maps for existing project activities;
- assist in collecting available data;
- assist in setting up a computer system including data base and G.I.S.;
- assist in processing, analyzing and evaluation the inventory data;
- assist in setting up and conduct field surveys;
- assist in interpretation aerial and satellite photographs to delineate agricultural zones;
- assist in preparation maps;
- assist in preparation reports.

Assistant geographers.

- assist the junior regional planners in carrying out the above tasks;
- act as interpreter during field surveys.

5

KEY REFERENCES

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3. 1986 Reconnaissance survey on the use of surface water in Al Bayda Province, main report and annexes.
4. 1988 RIRDP - Eleven years of experience in rural development.
5. 1989 Monitoring of rainfall and groundwater levels in Al Bayda Province, 1976-1987 (two volumes).
6. 1989 RIRDP - Position paper and monitoring report 1988.
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8. 1989 RIRDP - Plan of Operations, 1990-1992.
9. 1989 Socio-economic survey of water supply schemes.
10. 1990 RIRDP - Progress Report no. 48, October - December 1989.
Note: this document contains a full list of publications by the project since its inception.
11. 1990 Third review of the Land and Water Conservation Programme.

Republic of Yemen
Ministry of Agriculture
and Water Resources

Kingdom of The Netherlands
Ministry of Foreign Affairs
Development Cooperation
(Asia) Department

INVENTORY STUDY

**PERSPECTIVES FOR DEVELOPMENT INTERVENTIONS
IN AL BAYDA PROVINCE**

UPDATED STUDY PROPOSAL

4.08.046

November 1990

**Ilaco
Arnhem, The Netherlands**

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1

PRELIMINARIES

The study proposal, dated May 1990, has been discussed with the General Manager, the team leader of the TAU, the PME Unit of the RIRDP and the sector specialist of the Dutch Embassy. As a consequence of the discussions, an updated version of the terms of reference had to be made. Their different comments have led to an adaptation of the study proposal acceptable to all parties.

The difference between the original version and this new updated version mainly concerns:

- the change in focus to extend present RIRDP activities to the entire Al Bayda province into an inventory of potential for development interventions in this province;
- inclusion of a women impact assessment;
- inclusion of a comparative element of sectorial performance.

The above mentioned modifications have been authorized in a meeting at DGIS on 31 October 1990. These modifications have some consequences for the implementation of the inventory study and will be explained later.

Moreover, the definition of the study area has also been interpreted by the study team, the RIRDP management team and the TAU teamleader.

This is the updated version of the study proposal for "Perspectives for Development Interventions of the Al Bayda province". The phrases that differ from the original ones have been underlined in this final version.

It should be noted that there are also phrases from the original proposal that have been deleted in the final version. Therefore, both versions of the study proposal will be presented in the phase one report.

2

DEFINITION OF THE STUDY AREA

As the RIRDP possesses a lot of information about Rada district and all of the district's potential and due to the short period of time available for the Inventory Study it has been decided to confine the study area to the Al Bayda district. As a result of the unification of the Yemen in May 1990, the study area should not only comprise the Al Bayda district of the Al Bayda province as an administrative entity but should include adjacent areas as far as they form a geographic entity with the Al Bayda district.

3 INTRODUCTION

3.1 Background

Al Bayda province (including Al Bayda district) is located in the south-eastern part of the Republic of Yemen. It covers a mountainous area of approximately 11 000 km² and it has a resident population of about 380 000 (1986 census). The economy is based on, mainly rainfed, agriculture. There is no known mineral wealth in the area; industry has hardly developed. The province has a long history of migration dating back to the beginning of this century. The area is connected to the main north-south axis by the Dhamar-Rada-Al Bayda asphalt road, and a number of feeder roads connecting major population areas to this road. However, large parts of the province are only accessible by tracks with many bottlenecks. Health, education and other social services are still at a low level and lagging behind national averages per capita.

The area is arid to semi-arid, the average annual rainfall being 200 to 350 mm. Surface water resources are very limited. There are no rivers, although there are a few small perennial streams in the south of Rada District. Small dams are found throughout the area; many have silted up and only a few are still in operation. Traditionally, water for the supply of drinking-water and for irrigation has come from numerous dug wells and a number of springs. In the past decade, there has been a rapid increase in groundwater exploitation by deep tubewells, both for domestic water supply and irrigation. As a result, groundwater levels are dropping and there is a real danger of exhausting existing water supplies from deeper lying aquifers in a number of areas.

Since 1977, the Rada Integrated Rural Development Project (RIRDP) has been active in the area. Present activities include road construction and maintenance, domestic water supply and sanitation, livestock, agriculture and extension, land and water conservation, women participation programmes and hydrological studies. The project is financed jointly by the governments of the Republic of Yemen and the Netherlands.

The focus of the project has so far been on Rada district, which covers roughly one-third of the province, but it is intended that in the period 1990-1992, the project will extend its activities to other areas of the province. Indeed, since 1985 a start has already been made with the road construction, land and water conservation, agricultural and water supply programmes. As suggested in the Joint Yemen-Netherlands Evaluation Mission Report (August 1989) and elaborated in the RIRDP's Plan of Operations 1990-1992 (December 1989) a study is necessary to identify the most promising areas in terms of development opportunities and to gauge the development priorities of the rural population. The results of this study would guide future activities and set priorities for interventions. At the same time, such an inventory of potential and needs would provide a basis for planning follow-up programmes and activities for the future, and the role the Netherlands Assistance Programme, among others, could play therein.

The following sections present the proposal for the study. They outline the basic strategy, scope and components of the study as well as its phasing, staff input and organization.

3.2 Institutional framework

The Rada Integrated Rural Development Project. The study will be carried out under the auspices of the RIRDP. The project has four staff units: a) Finance, b) Administration, c) Planning, monitoring and evaluation (PME) and d) Information. The executive sections include: a) Agriculture and Al Khabar farm, b) Maintenance, c) Roads and Land and Water Conservation, d) Engineering (water supply, geohydrology and sanitation), e) Rural Women Extension, f) Livestock and g) Agricultural Extension. The General Manager of the project is assisted by a Technical Assistance Unit (TAU).

The RIRDP falls under the responsibility of the Ministry of Agriculture and Water Resources and more specifically under the General Directorate for Cooperatives and Rural Development (GDCRD).

The RIRDP is the sole agent of the Ministry of Agriculture and Water Resources in Al Bayda Province (the small office in the provincial capital has been put under the umbrella of the RIRDP) and as such regarded by the Ministry as its executive regional branch.

The Governorate. The Governor's office and those of the nahiyahs (sub-districts) are mainly concerned with interior and judiciary affairs, development activities being left to the Local Councils for Cooperative Development (LCCD, see below). In addition, many ministries have an office in Al Bayda town and some (Education and Finance) also in Rada town, but their capacity is small and their activities bear no direct relationship to those carried out by the RIRDP.

The exception is the Ministry of Public Works which is represented in the province by the Highway Authority. This body is in charge of the main roads in the area. The Authority has offices in Al Bayda and Rada, from which it maintains the tarred road leading from Dhamar to Al Bayda and the gravel road from Rada to Juban.

LCCD's and villages. Most contacts between the project and the population are channeled through LCCD's or direct through village leaders. There are 16 LCCD's in Al Bayda province. They originate from the Local Development Authorities and do not always coincide with the boundaries of a sub-district. The LCCD consists of an assembly of officials appointed by the government and elected representatives from each village in its area, out of which a board of 5 to 7 members is chosen. The board holds office for three years; three functions (president, treasurer and secretary) carry a salary. At the provincial level, the LCCD's are represented in the Coordinating Council. This council, but also the individual LCCD's, have direct access to the national body, the Confederation of Yemen Development Associations. The LCCD's are financed from various sources: donations from the national board and provincial council, direct contribution by villages and part of the Zakkat (religious tax) which is refunded by the government to the LCCD's.

STRATEGY AND OBJECTIVES

In the last few years, the project has been facing two main issues:

- the need to expand project activities to areas outside Rada district so as to bring about a more balanced contribution of the project to the entire province, and
- to identify follow-up activities for the period beyond 1992 when the project in its present form will come to an end.

The expansion of project activities to Al Bayda district is no longer an issue of discussion. In fact there has already been a shift of some of the activities. The 1989 Evaluation Mission estimated that roughly 10% of the agricultural extension activities are taking place in Al Bayda district; corresponding proportions in water supply, roads and land and water conservation are 35%, 65% and 35%, respectively. There are also advanced plans to construct a substation in Al Bayda.

While the expansion of activities is no longer in dispute, there is considerable uncertainty as to its extent. Furthermore, project activities are at various stages of maturity and thus of readiness to be expanded. The strategy of the study is to take inventory of the spatial distribution of the development potentials and needs in the study area, and to define in close conjunction with project staff and local authorities, selection criteria which will enable the identification of priority areas for future interventions.

Consequently the study will have a broad-based orientation and at this stage cannot go into too much detail. The main purpose of the study is to make a broad-based sectorial inventory (the "complete" picture), to compare sectorial performance with sector averages in other provinces and at the national level, and to select sectors with a high potential for development. Thus, it will be possible to give direction for total development in the Al Bayda province, and to consider the relevant importance and requirements of a particular sector in this province.

The study shall comprise of sectorial inventory, followed by an integrated analysis and planning, identification of trends and developments on the basis of comparison with provincial and national averages, and formulation of an indicative development programme. It is understood that the determination of the relevant importance of a sector will depend on the data available and their accuracy. The comparative element should be based on social parameters indicating the degree of social security of the population. Limitations in this approach should be clearly stated.

The inventory will include an assessment of the distribution of:

- agricultural land and rangelands;
- water;
- population;
- basic social infrastructure, such as schools, health centres water supply and roads.

This information should allow for the identification at reconnaissance level of priority programmes to be undertaken in the future. The inventory will be designed in such a way that a skeleton planning framework is provided for future, more elaborate regional planning.

In order to identify possible future interventions, the study will have to address four important thematic issues:

- to assess the land and water resources in general and the problem of the depletion of water resources in particular;
- the problem of migration and the expected reduction of remittances;
- structural improvement of the position of the women in social and economic processes;
- the weak planning capacity at provincial- and local authorities for development levels (LCCD's, and their equivalent in former South Yemen).

At this stage, the inventory will neither touch macro-economic aspects, nor provide bankable projects, as there will be no direct link with expansion, implementation or financing of the present RIRDP with regard to the period 1990 - 1992.

Thus, the objectives of the study can be summarized as follows:

- a) to provide an inventory of development potential and needs in the study area;
- b) to identify the relative importance of sectors by comparison of sectorial performances in the province with those at national level;
- c) to formulate indicative development programmes;
- d) to set up a framework and data base for future regional planning.

5 PHASES AND COMPONENTS OF THE STUDY

5.1 Phasing

The study will be implemented over 6 months in three phases:

- Phase 1: (1.5 months) data review and assessment, preparation of indicative maps, quick reconnaissance survey of the entire province, including visits to all Local Authorities for Development (LCCD's, etc.), selection of ranking criteria and selection of priority areas, women impact assessment and preparation of report phase 1, preparation of phase 2.
- Phase 2: (3 - 3.5 months) in depth field surveys including visits to all Local Authorities for Development (LCCD's, etc.) in all promising areas, thematic studies, comparison of sectorial performance with provincial and national figures, preparation of phase 3.
- Phase 3: (1.5 months) Analysis and check of field data, workshop, draft preparation of indicative development programmes, finalization of basic maps and data base, preparation of final study report.

5.2 Review and assessment

As there is a lack of reliable maps for the bigger part of the study area it is impossible for the study team to prepare thematic maps. Nevertheless, the study team will prepare indicative maps for the priority areas which have been identified in phase 1 and investigated in phase 2 of the study. The data collected will be stored in a data bank. This will be related to geographical information systems (G.I.S.) that are compatible with other systems in the Republic of Yemen and suitable for future regional planning. Project counterpart staff will be trained in the use of the system. The following variables, among others, will be taken into consideration:

Agricultural zoning. In 1983/84 (ref. 2) and 1986 (ref. 3), studies have been carried out on the land and water resources of Al Bayda Province. Irrigable and actually irrigated lands for some areas are indicated on 1:50 000 maps. The present study will update the assessment of the agricultural potential on the basis of satellite imagery of the study area, rainfall (if possible) and other water related data available, by field checks. It will subdivide the selected priority areas in zones according to landuse (indicating for each zone irrigable land, rainfed land and rangelands) and develop a scoring to differentiate the agricultural potential between the zones. The focus will subsequently be narrowed by including other criteria for sub-zoning (if possible and necessary).

Population. On the basis of the 1986 National Census and other available data a 1:100 000 map of the distribution of the population will if possible, be prepared for the study area, at least to the detail of the agricultural zones.

Water supply and sanitation. An extensive study on the water supply and sanitation conditions in the province was carried out in 1983 and 1984 (ref. 2). In total, 178 villages were covered. The present study will delineate priority areas for water supply and sanitation. It is believed that the general conditions have not changed much since 1984, except for areas where the project has been active. However, short surveys will indicate and/or fill in major data gaps.

Roads. On the basis of existing maps, satellite imagery and available data, the study will describe the road system and the main settlements.

Social services. In order to obtain a measure of the level and distribution of social services in the rural areas of the study area, the study will collect data on educational and health facilities. Data will also be collected on the quality of the services, e.g. number of teachers and students, class attendance, etc. Available data will be checked on accuracy through sample field visits in phase 2 of the study.

Women impact assessment. The women impact assessment (wia) aims at assessing, in advance, the expected effects of anticipated interventions. On the basis of information gathered in the second phase, the direction of the expected effects of proposed development interventions on women in the priority areas will be assessed.

Defining selection criteria. The study will define a few criteria for prioritizing areas for future development programmes. These are likely to include: i) agricultural potential, ii) number and density of population, iii) basic social infrastructure and iv) women and development. The study will distinguish by means of simple scoring and ranking methodology, the priority areas in the study area in which each of the proposed development interventions should take place.

5.3 Surveys

During phase 1 and phase 2, field surveys will be conducted including survey design and sampling, preparation and testing of questionnaires and data collection, processing and analysis. The following surveys are foreseen:

- a) short surveys to fill in major data gaps identified in the first phase of the study;
- b) surveys of local authorities for development (LCCD's, etc.):
 - to gauge their opinion on development prospects and needs as well as on development priorities;
 - to study the functioning of these organisations in the priority areas with regard to planning and implementation capacity and their relationship with present and future activities; and determine training and other requirements;
 - to make recommendations for follow-up activities;
- c) migration study. Sample survey in selected areas:
 - to determine trends and causes of migration;
- d) other surveys to be identified in phase 1 of the study.

5.4 Preparation of indicative development programmes and final reporting

On the basis of the results of the inventory and surveys conducted in the first two phases, the study will identify activities that may be taken up for implementation. The planning horizon will be the year 2000. It is the intention to formulate indicative development programmes. These activities can be taken up separately or together by the Yemen authorities for application of donor assistance. Most of these activities will require further (feasibility) studies before implementation.

The study will formulate in consultation with the Governor, the Ministry of Agriculture and Water Resources, Ministry of Planning and Development, the project management and other relevant Yemeni authorities and Netherlands authorities a tentative priority programme. To facilitate the decision making, it is proposed to hold a workshop with all relevant parties participating. The scope and mechanism of such a workshop will be worked out during the study.

A draft report will be submitted to the RIRDP management and the Dutch Embassy before leaving Yemen and final reporting and mapping will take place in the Netherlands.

5.5 Planning system

The study will set up a computerized data base system and geographic information system (GIS) that is compatible with other systems in the Republic of Yemen, and suitable for future regional planning. Project counterpart staff will be trained in the use of this system.

6 ORGANIZATION AND STAFFING

The study will be carried out by Ilaco in association with the Department of Geography, University of Utrecht, and the Sana'a University, under the auspices of RIRDP and will maintain close links with the sections of the project. The direct counterpart organization will be the Planning, Monitoring and Evaluation section which will provide the liaison between study team and the project, the Ministry of Agriculture and Water Resources, the Governor, the local authorities for development and other Yemen Authorities. The PME section will collect all existing data. The Head of this Section will be the counterpart to the study team leader and participate in the study on a part-time basis. The technical adviser of the section will also participate part-time, while one member of the section will be assigned to the study on a full-time basis.

The composition of the study team is as follows:

- a sociologist/rural development planner (team leader)
(Mr. E. Prowizur);
- an agricultural planner
(Mr. J.P. van Staveren);
- a water resources planner
(Mr. W. Boehmer);
- an anthropologist
(Ms. L. Scheepers)
- a senior regional planner
(Mr. J. Floor);
- three junior regional planners/geographers
(Mr. A. Kolhoff, Ms. P. Brombacher, Ms. A. Scholten);
- three Yemeni assistant geographers
(to be identified).

The main tasks and responsibilities of each team member are summarized below.

Team leader.

- co-ordinate and supervise the activities of the other team members;
- guide the PME section in collecting existing data;
- plan and guide the field surveys;
- represent the study team in meetings with Yemen authorities;
- design and conduct the thematic studies;
- draft the priority and indicative programmes;
- report regularly on progress of the study to project management;
- final reporting.

Agricultural planner.

- prepare the agricultural zoning;
- establish the ranking and selection system, in conjunction with the team leader and senior regional planner;
- participate in field surveys;
- assist in drafting the priority and indicative programmes;
- assist in final reporting.

Water resources planner.

- review and assess available (geo-) hydrological data;
- prepare surveys for filling in data gaps;
- assist in preparing the agricultural zoning;
- provide backstopping.

Anthropologist.

- advise on issues concerning women and development
- assist in drafting the priority and indicative programmes
- assist in final reporting
- will report on Women Impact Assessment

Senior regional planner.

- guide the junior regional planners;
- advise on planning and execution of the field surveys and the processing and evaluation of data;
- advise on computer processing of data and supervise the preparation of maps and tables at the head office;
- advise on the ranking and selection methodology;
- provide backstopping to the junior regional planners.

Junior regional planners.

- assist in preparation of a data base and maps for existing project activities;
- assist in collecting available data;
- assist in setting up a computer system including data base and G.I.S.;
- assist in processing, analyzing and evaluation the inventory data;
- assist in setting up and conduct field surveys;
- assist in interpretation aerial and satellite photographs to delineate agricultural zones;
- assist in preparation maps;
- assist in preparation reports.

Assistant geographers.

- assist the junior regional planners in carrying out the above tasks;
- act as interpreter during field surveys.

PME section

- maintain contacts between study team, project management and Yemeni authorities.
- translation (if necessary) of all research documents relevant for the study (arabic - english; english - arabic).
- collection of existing data;
- assign one staff member full time to the study.

7

KEY REFERENCES

1. 1981 RIRD - Plan of Operations, 1981-1982.
2. 1984 Study into water resources in Al Bayda Province; main report, annexes, maps, appendices and addendum.
3. 1986 Reconnaissance survey on the use of surface water in Al Bayda Province, main report and annexes.
4. 1988 RIRD - Eleven years of experience in rural development.
5. 1989 Monitoring of rainfall and groundwater levels in Al Bayda Province, 1976-1987 (two volumes).
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Note: this document contains a full list of publications by the project since its inception.
11. 1990 Third review of the Land and Water Conservation Programme.

INTERPRETATION OF THE TERMS OF REFERENCE FOR THE WOMEN IMPACT ASSESSMENT

The proposal is to make an ex-ante women impact assessment as part of the master inventory study in the Al Bayda district. By focussing explicitly on women it will be assured that development interventions will have a positive impact on women. Firstly this requires an insight in the activities and objectives of the Rural Women Extension Section (RWES) in the actual project area of Rada district.

A description will be given of the objectives and current activities of the four programmes of the RWES, i.e. agriculture, livestock, health and nutrition and handicrafts. Constraints encountered by the advisors and their specialized extension agents in executing their activities will be indicated. By visiting villages in which the earliest established activities of the RWES took place their adoption in time can be assessed by discussions with the village women involved. Recommendations will then be made to ameliorate the project interventions of the Rural Women Extension Section.

On the basis of the information gathered in Rada district, assistance in the preparation of the questionnaires will be given. These questionnaires will be executed by the study team during the second phase of the master inventory study to assess the local situation in Al Bayda district.

Field visits will be made to the priority areas selected in Al Bayda district to gain a comparative insight into the local situation with reference to women.

Resulting from the experiences in Rada district and the data gathered in Al Bayda district the direction of the expected effects of proposed development interventions on women in the priority areas can be assessed. This information will provide a basis to assist in proposing recommendations for new development interventions during the third phase of the master inventory study to ascertain that women's position will be strengthened.

The methodology to be followed will consist of semi-structured interviews with the four advisors of the RWES and village women involved in activities of the RWES. In the selected priority areas in Al Bayda district semi-structured interviews will be held with village women. Additional information will be gathered by participant observation.

ANNEX B

Reports of the quick field surveys

Areas visited:

- As Sawadiyah and At Taffah nahiyas (wadi Hamra)
- As Sawmah and Mashwarah nahiyas, wadi Ghaylan (wadi Al Ghayl) and upper wadi Bayhan
- Mashwarah nahiya, Bayhan muderiya, Na'man nahiya, Nata nahiya and Harib nahiya
- Dhi Nahim nahiya, Al Baydah nahiyas and Lowdar muderiya (Mukeiras centre)
- Yaffi muderiya in Lahaj governorate
- Nisab muderiya in Shabwa governorate and Markha nahiya

Checklist used during quick field surveys

VISIT TO AS SAWADIYAH AND AT TAFFAH NAHIYAS (WADI HAMRA)
(8-9/10/90)

1) The Main Plateaus

The two nahiyas of As Sawadiya and At Taffah are located in the western part of Al Bayda district. They have little relief and lie at an altitude of 2000 meters. As spate irrigation is not possible on these plateaus, water is a scarce factor and therefore agriculture is mainly rainfed. On these plateaus, groundwater extraction is expensive due to the depth of the water. As a result of the scarcity of water, irrigated agriculture is not sustainable according to the study team. Exceptions are to be found along the main road Rada - Al Bayda where some irrigated fields provide crops to the main settlements in the vicinity of the road (Al Asma, capital of At Taffah nahiya and As Sawadiyah, capital of As Sawadiyah nahiya). Some irrigated fields also provide qat as a cash-crop.

The plateau of At Taffah nahiya is dissected by two main wadi's amongst which is wadi Hamra. From the plateau there is a road into the wadi with a very steep slope over a distance of 3 km. The plateau is characterized by very poor fields of sorghum and wheat, almost exclusively rainfed with yields which are probably less than 1000 kg per hectare. As soon as one descends into wadi Hamra the situation changes completely (see below). As these nahiyas are traversed by a tarred main road, social services are of a better level on the plateau than in the more isolated areas.

2) The valleys and the wadi's

The few wadi's in As Sawadiyah Nahiya run westwards to form the catchment area of wadi Mansur in Rada district. At their source (in As Sawadiyah) the wadi's are too narrow and too dry to allow any economically viable agriculture. There are also a few valleys in these two nahiyas where the land is lower than the main plateaus. In these areas the soil is more moist, making agriculture possible. Some irrigated fields are also to be found in these valleys. This is the case in As Sawadiyah nahiya, Al Had Medana in the village of Al Maladjim, and also in the village of El Afadj in At Taffah nahiya. These places are located on the bad road between Nata nahiya and the main road. However, for sustainable development these valleys are too small in various ways. A main exception is to be found in wadi Hamra.

a) Wadi Hamra

Wadi Hamra has a very good agricultural potential, except that the useful surface for agricultural activities is very limited. The length of the useful land is 15 km long and has an average width of 150 meters. This amounts to 225 hectares. The population is 2700 persons (de jure population). 600 men have fixed wages of which 300 work in the Gulf Oil States and 300 are workers in Yemeni towns.

The needs are thus: 2100 people x 200 kg per person per year = 420 tons. The agricultural potential is evaluated as:

- 75% of the surface is under sorghum with a yield of 2500 kg per hectare

- which means 450 tons. This fits their needs.
- maize is less than 20%
 - there is very little wheat, less than 5%
 - millet is also less than 5%
 - no alfalfa,
 - little qat, less than 10%,
 - coffee is about 10% of the agricultural land,
 - moreover there are fruit trees (bananas, oranges, limes, papayas),
 - there is little cattle (and thus no or very little alfalfa).

The population is self-sufficient, which is proven by the fact that the emigration rate is lower than the provincial average. In Wadi Hamra about 35% of the adult male population is reported to be outside Yemen in comparison with 58% for the whole province (according to census). Moreover coffee-marketing also brings in some money. People mostly buy rice (changing their diet-habits), sugar, tea and ofcourse manufactured products.

The inhabitants never complain about the quantity of water, neither its quality. Till 1988 they didn't irrigate their fields except by traditional ways (spate irrigation, compartmental bunds, diversion of the flood water) but they have started to irrigate by modern means since last year due to the shortage of rain.

There is an interesting system of self-help: the bunds of the wadi are regularly maintained by the people whose land is located next to the particular section of the wadi. They build protection walls with stone blocks. For irrigation, each farmer has built himself a few meters of pipes to be added to the main line, parallel to the wadi. The water for irrigation is rented for an average of 60 to 80 YR an hour from the owner of the shallow well, pump and engine. There is no sharecropping nor land renting. The only constraining factor is the impossibility of expanding agricultural land.

According to the study team these are the main needs in wadi Hamra. There are only 4 schools of which 2 are located in buildings (the other 2 being held under trees). There are also only 4 Sudanese teachers (paid by the government, and housed by the LCCD). Boys usually go to school from the age of 7 for a few years. Due to shortage of teachers, girls do not attend school. In one of the 12 villages of Wadi Hamra (Al Arba) parents send their girls for private lessons to one teacher in the afternoon. But they are quite reluctant about this matter, firstly because it costs them money (20 YR a month) but most of all because they want a female teacher for their girls.

Health centres do not exist. People go to Al Asma or Al Bayda. The road from Al Asma to wadi Hamra is very bad for the first 19 km. It continues into a very steep gorge (about 25% slope) after which there is no road at all, one must follow the wadi.

People are certainly not poor according to the agricultural potential, fixed wages and remittances. As proof, almost every house is connected to an electricity scheme, privately owned in every village. The cost is reported to be 25 YR per neon light per month as it usually is in the rest of the province. Due to the dispersed location of the houses, no water supply scheme is possible. Moreover out of the 12 villages, only 2 of

them have a sufficient number of inhabitants for a scheme to be sustainable (more than 350 people). As there are a lot of shallow wells, with enough good water, not far from the villages, the wish for a scheme is not very high.

VISIT TO AS SAWMAH AND MASHWARAH NAHIYAS, WADI GHAYLAN (WADI AL GHAYL) AND UPPER WADI BAYHAN (11-13/10/1990)

1) The wadi's and the valleys

According to the satellite photo's, a large area of agricultural land is to be found in a sharp bend of wadi Al Ghayl. As this might be a promising agricultural area, a visit was scheduled on 11, 12 and 13 october 1990.

No one in the surrounding areas seems to have heard about wadi Al Ghayl. Some people believe it might be wadi Ghaylan, which, according to the team, is located much further south. This bend will therefore be named upper wadi Bayhan.

The team has tried to reach this area by three different roads:

- From the tarred road, near Al Bayda town, a track which has been drawn on several maps was followed by the team. This road was supposed to lead all the way to wadi Al Ghayl and continue to lower wadi Bayhan which is located in former South-Yemen. After 25 kilometers of very difficult track, it came to a dead-end.
- According to various people, a road from As Sawmah leads west to a small valley called wadi Ghaylan. This wadi is supposed to continue into upper wadi Bayhan. Unfortunately, after arriving in this valley, which is about 30 kilometers from As Sawmah, this road also leads to a dead-end.
- From Mashwarah town a steep and difficult mountain road leads to upper wadi Bayhan. Once there, the team decided to follow the wadi upstream for about 40 km to this sharp bend. Unfortunately after a few kilometers there was no motorable road anymore.

People have never heard about agricultural activities in upper wadi Bayhan. The team still thinks that a visit should be paid to this strange area, as the satellite photos clearly show the presence of agricultural activities.

This visit to upper wadi Bayhan has, however, been usefull for two main reasons:

a) upper wadi Bayhan itself is a very wide wadi (about 500-1000 meters in width) with a perennial stream in it. Agriculture should thus be possible and sustainable. However, this area is almost completely devoid of inhabitants. Only nomads pass through.

There is a lot of firewood available which is not gathered by anyone. The area supposedly belongs to the people of Mashwarah. Some of them maintain a few qat fields in the wadi, irrigated by private shallow wells and guarded on by hired watchmen. The landowners argue that they are ready to rend their land to anyone who would ask for it, for a very reasonable price: 25% of the yield (the average price for share-cropping usually is closer to 50%).

The people of Mashwarah explain the lack of agricultural activities with a big flood in 1977 which destroyed all cultivable land. This forced people to definitively leave this area and to settle, true for most of them, in Gulf-Oil States. If this migration really took place only men would have left leaving their women and children somewhere near the wadi, as this

would be the only land they owned.

Some very old houses, in ruins, still stand near the wadi, but they have been abandoned much earlier than the big flood took place. Even at that time (before 1977), there were most probably only nomads in the wadi, otherwise more villages would have been seen in the area. As this is not the case, all the questions of the study team remain unsolved.

The second visit planned to lower wadi Bayhan might partly explain these two strange situations:

* Is the sharp bend in upper wadi Bayhan cultivated or not?

* Why are there no agricultural activities just north of this bend in upper wadi Bayhan?

2) Rangelands

All the rangelands in As Sawmah, Mashwarah and Al Bayda sub-districts (nahiyas) are very rough, desertic areas. Water is very scarce and only available thanks to boreholes. Due to the very high price of water extraction, agriculture is not economically sustainable. Nevertheless, these areas are inhabited by a large number of people who live in quite big villages. Most of them have street lights, the people live in modern and huge houses, most of them are connected to an electricity scheme and a village- or a private water scheme. Almost every house has television and there are also many new cars. Mainly women and children live in these villages. There is nearly a complete lack of agriculture and only small herds of cattle exist as there is nothing to feed the animals.

The explanation for such a strange situation is that most of the men work in Yemeni towns or in Gulf-Oil States, leaving their families behind. This situation is even more accurate in As Sawmah nahiya, in an area located about 20 kilometers North-East of Al Bayda town. The land is more rough and desertic than anywhere else while the standard of the villages and houses is higher than anywhere else in the sub-district. The remaining men earn their living by smuggling with Saudi Arabia. The men leave their families in their nice houses for "business trips" which take 10-14 days. On returning they load their cars full with goods and foods for their families. Even if these activities should certainly not be stimulated, it is most interesting to know about them and to keep in mind that the people still need basic social infrastructure and public services.

VISIT TO MASHWARAH NAHIYA, BAYHAN MUDERIYA, NA'MAN NAHIYA, NATA NAHIYA AND HARIB NAHIYA (16-21/10/90)

Topographically the nahiyas are divided on the one hand into the wadi beds and the surrounding arable fields and on the other hand into the upslope rangelands. As such they will be discussed in this report.

1) The Rangelands

The rangelands of these areas have a very low population density. Agriculture, if possible at all, can only be rainfed. As the rainfall in this part of the study area usually is about 100 mm per year, the population relies mostly on livestock (predominantly goats and sheep). However, the grazing capacity of the rangelands is very low because the surface is densely covered with stones and rock outcrops are abundant. The people living on these rangelands are usually called "the nomads" by the villagers (who are sedentary) and in fact that is what they are. They usually descend to the nearest valley or wadi to fetch water for domestic purposes. For a living they sell the male animals (for meat) to the villagers. The female animals are kept for milk and reproduction. Another way of earning money is to fetch firewood and to sell it to villagers. The nomads in turn buy some grain from the villagers but for the most their dietary habits are oriented to animal products (meat and milk).

Of course, the basic social infrastructure for the nomads is of a much lower standard than that of the permanent settlements. The idea of "schools for nomad people" has never reached these areas (as it has for some nomadic groups in other parts of the world). They usually are not able to send their children to any kind of school and only by chance do they make use of medical facilities (while passing by health centres which are normally located in the main permanent settlements of the nahiya; in its capital).

As can be expected in such remote and poor agricultural areas, the emigration rate is amongst the highest of the country. Also the few permanent settlements which are to be found in the nomadic areas mainly survive with the help of remittances from the emigrants. As a result the number of men in these areas is very low; the population mainly consists of women and children. In supplement these sedentary people practice irrigated agriculture on a small scale.

When it comes to figure out the number of people living in this part of the study area, one must be very careful. The limits of a census are well known, even when it comes to the number of resident villagers. The census is usually carried out by careless investigators, especially concerning the remote areas. Also it could be that many residents were afraid new taxes would be imposed on them and therefore they purposefully underestimated the number of people living in the households. Besides, many villages have not been reported in the 1986 census.

a) Mashwarah Nahiya

The census of 1986 gives a total population of 3746 inhabitants for Mashwarah Nahiya. There is little agricultural land in this nahiya, like in the sharp bend in upper wadi Bayhan (the former and unknown "wadi Al Ghayl"). During this field trip the study team was able to visit this bend in the wadi. The agricultural land there (probably more than 100 hectares) is cultivated by the same Rassas family that owns the whole area. They don't cultivate the land themselves, rather they let hired land-labourers do it for them. These landowners can certainly not be called nomads as they live in villages. Most of the landowners of upper wadi Bayhan live in the town of Mashwarah, the capital of Mashwarah nahiya.

There is a limited number of primary schools in the nahiya, and only one secondary school in Mashwarah town. The same applies for health centres and hospitals. There are some roads, most of them built by the LCCD, usually with the help of the population (in cash and in kind). There is a "good" road from As Sawmah to Mashwarah (2 hours for 40 km) another one from Mashwarah to Markhah (one and a half hours for 25 km) and a very difficult road (especially the last part of it) from Mashwarah to wadi Bayhan (one and a half hours for 15 km). A four wheel drive vehicle is advised on these roads.

b) Nata Nahiya

When it comes to figure out the number of nomads inhabiting an area, the precision of a census is much lower than for the number of sedentary inhabitants. This nahiya has a total population of 5114 inhabitants according to the census of 1986. There are very few permanent settlements in this nahiya. The capital of Nata nahiya, a small village called "Al Ghayla", is even not reported in the census. Most people in this nahiya are nomads and there is almost no agricultural land at all. There is probably one school and one health centre in Al Ghayla. The study team is not completely sure about this since it was unable to meet the LCCD representative, despite an appointment and several attempts to meet him or his assistant. There are few roads in the nahiya, the main road leads from Al Ghayla town to the tarred road between As Sawadiyah and Al Bayda. This road, crossing the entire nahiya, is difficult and requires a four wheel drive vehicle. The trip from Al Ghayla to the tarred road will take about 3 hours for 50 km.

c) Na'man Nahiya

The 1986 census gives a total population of 9216 inhabitants for Na'man nahiya. From the ten medanas mentioned in the census, eight of them are located in the rangelands and are thus mostly inhabited by nomads. The last two medanas are located in Upper wadi Khirr, with a population of only 565 people (according to the census). This figure differs greatly from the number of people which is mentioned by the inhabitants of these two medanas. They claim that 3000 people live in the area of wadi Khirr located in former North Yemen. Out of the 12 villages in these two medanas, only 7 are reported in the census. The study team estimates the total population of this part of the wadi to be about 1500 people. This fact is important since the agricultural possibilities in the wadi are certainly good. In the second part of this report the importance of this combination (agricultural possibilities and population) will be explored extensively.

As far as the basic social infrastructure is concerned, there are two schools in the wadi and one health centre. The number of schools and health centres for the rangelands in this nahiya could not be estimated. No road exists from Bayhan city to the capital of the nahiya, Sa'ahah, one must just follow the wadi (about 30 km). Nevertheless, there are no problems travelling this way. There is a road from Sa'ahah to Al Ghayla, the capital of Nata nahiya. The first 2,5 km of the road climbs a mountain with a gradient between 25% and 30%. This is a very bad, dangerous and difficult road which can impossibly be done without very good four-wheel-drive vehicles (the 4WD system being in action the whole way up the mountain). According to the people, this road has been done by the army before unification of Yemen to allow a link between Na'man nahiya with former North Yemen. Otherwise, most of the contacts of the people in this nahiya were with the nearby Bayhan muderiya.

d) Bayhan Muderiya

The wadi Bayhan Agricultural Development Project (based in Nuqub) estimates the total numbers of inhabitants in the muderiya at 60,000 people. Of this number 15% is nomadic living in the rangelands (thus maybe 10,000 people). The standards of the basic social infrastructure for those 10,000 nomads is about the same as for the surrounding nahiyas, in other words it is quite low. Nevertheless, Bayhan town offers a much higher standard for schools and hospitals than anywhere else in the area since the city is inhabited by 15,000 people. Besides the fact that Bayhan town is a large city, the standards for basic social infrastructure are quite high in former South Yemen. This particular subject will be discussed more deeply in the second part of this report.

e) Harib Nahiya

This nahiya is administratively located in Marib Province, but its geographical particularities make that it can be considered as part of Al Bayda Province and Bayhan muderiya. This because of the fact that wadi Harib originates in Al Bayda Province and empties out into the Marib desert. A small number of nomads live in the rangelands; the remainder of the inhabitants are sedentary and have settled in villages in wadi Harib and wadi Ayn.

There is one very good road from Harib to Marib and another reasonable road which follows the border of the 'Rub-al-Khali from Harib to Bayhan town (about 2 hours for 40 km). This road is a very busy one, being used day and night, mostly by smugglers. There is also a very bad mountain road from Harib to Bayhan town across the Mablaqah Pass. When the study team arrived at the bottom of the pass, it decided to turn back: the slope is probably too steep for a car, even a four wheel drive. According to the people, this road is almost completely abandoned.

f) Conclusion concerning the rangelands

As can be seen, there are only very limited possibilities in these low populated areas, with difficult access to them. There is no agricultural potential, since irrigation can be done only at very high costs due to the depth of the water. Livestock-keeping is nearly the only way to survive; it is not seen as an economic investment by the people.

As most of the people are nomads, basic social infrastructure is very difficult to develop in the rangelands themselves. Only the main settlements in this area can be equipped with this type of infrastructure (this is to say: Mashwarah town, Al Ghayla, Sa'ahah, Bayhan town, Nuqub and Harib).

As far as schools are concerned, they will most probably be used by the villagers instead of the nomads. The situation is different for hospitals since they are only used once in a while when necessary.

2) The Lowlands and the wadi's

a) Geographical location

This is naturally the location where most of the interesting agricultural potential is to be found. The lowlands and the wadi's in the nahiyas and muderiya form part of two different wadi systems. wadi Bayhan and its tributaries form the biggest and most important one. Wadi Nahar (also called Upper wadi Bayhan) is located upstreams in the west. Wadi Khirr forms the eastern branch. They both join in Bayhan town and continue as wadi Bayhan northwards to Nuqub and empty out in the Marib desert. West of this huge system is wadi Harib and its main tributary: wadi Ayn. Most of these lowlands are situated in Bayhan muderiya except:

- Parts of upper wadi Bayhan (wadi Nahar) which originate in Mashwarah nahiya. There is one agricultural spot in a sharp bend in this part of the wadi. However, this spot is only cultivated by hired men working for the Rassas Family in Mashwarah town. As there are no residents in this part of the wadi, this area does not have a promising agricultural potential, since the number and the density of the population is considered as one of the most important criteria.
- The upper part of wadi Khirr originates in Na'man nahiya. In this part, there are 12 villages with agricultural land. The conditions under which these people live resemble the living conditions of inhabitants of Lower wadi Khirr in Bayhan muderiya very much. An important exception concerns the basic social infrastructure in Upper wadi Khirr. This will be elaborated hereafter.
- Although a small part lies in Marib province, the main part of wadi Harib (including wadi Ayn) is located in Bayhan muderiya and it originates in Al Bayda province. But this upper part of the wadi is too narrow and carries too little water to be considered as an interesting spot for the second phase of the study.

b) The catchment areas

All the wadi's considered have their source in Al Bayda province. The catchment area of the wadi Bayhan system includes wadi Nahar in the east, wadi Khirr in the west and wadi Bayhan in the north. This catchment area is so huge that the average annual outflow, such as measured in Bayhan city, amounts 50 millions cubic meters of water. In this very arid area, a perennial stream (with some fish) can be found. According to the wadi Bayhan Agricultural Development Project, 1/3 of the outflow is contributed by wadi Khirr in the west while 2/3 comes from wadi Nahar. The catchment area of wadi Harib is much smaller.

c) **Hydrology concerning agriculture in the main wadi's**

The runoff water collected in the catchment areas due to rains, concentrates in the wadi's. This may result in floods. On the one hand the floods may damage the arable lands while on the other hand the water is used for irrigation purposes. Depending on the precipitation several floods a year may occur (2-10). Exceptionally large floods in the past washed away parts of the arable lands. Some floods witnessed by inhabitants were:

- Upper wadi Bayhan, 1977;
- Midstream wadi Bayhan, 1982 and;
- wadi Harib, 1983.

The study team was told that this was probably the reason that some villages were abandoned in the upper part of the wadi Bayhan system. Either with or without the help of the Agricultural Development Project of Bayhan, some villages try to protect the agricultural land on terraces by protective devices (e.g. gabions and dams).

Rainfall forms a minor contribution to the agricultural water needs. The floods are partly used for irrigation of the arable fields along the wadi. Furthermore part of the floodwater infiltrates, thereby increasing the level of the water table. Due to the above mentioned circumstances and the fact that the wadi's become wider downstreams, the depth and force of the floods decrease while flowing downstreams.

Besides using flood water for irrigation the inhabitants of the wadi also make use of water from shallow wells and boreholes. Downstreams people are forced to rely more on water from boreholes as they receive less water from floods and the groundwater table is deeper. Therefore the number of boreholes increases downstreams while the number of shallow wells decreases. As a consequence of less available surface water downstreams, the costs of a cubic meter of irrigation water are on average higher than upstreams.

d) **The political and socio-economical situation**

Former South Yemen gained independence in 1967. An agrarian reform took place in the beginning of the 70's. In other words the land owned by landlords (sjeikhs) was confiscated by the government. The government increased the agricultural surface and improved the existing agricultural land. This was either done by the government itself or by villagers with governmental support. These 'new' lands were distributed to landless and small scale farmers, with the obligation of joining a cooperative. It is of paramount importance to mention that private ownership of land was allowed. The majority of private landowners chose not to join the cooperatives. Some former landlords also joined one of these cooperatives while others left the country permanently (usually to Saudi Arabia).

As a result, both systems, cooperatives and private farmers, are to be found in the same villages and sometimes within the same families. It is important to realize that the agricultural lands next to the wadi beds are in better condition and therefore have a surplus value in relation to lands situated further from the wadi bed. These lands are mostly privately owned. More agricultural land was created by the government further from the wadi bed and, therefore, floodwater influence. This was done by digging shallow wells in these statelands and sometimes by constructing diversion channels from the wadi bed to the new lands. The farmers of these lands

automatically joined a cooperative.

Characteristics of the agricultural cooperatives are:

- There is no obligation to join a cooperative. Farmers are free to choose or to quit membership. Besides, former landless farmers were enabled to cultivate land of their own.
- Several cooperative members must share one well; averages are not known but the Bayhan Agricultural Development Project gave the study team an example of a cooperative in Nuqub. There are 507 members (=households) that have to share 124 wells in the cooperative. The total area is 2650 feddans which means an average of 5.2 feddans per person (1 feddan = 0.42 hectare). A constraining factor felt by the farmers is the fact that several farmers must share one well. Therefore the land of each farmer is not always irrigated at the right moment.
- Cooperative members have better access to inputs. These are:
 - * credit;
 - * seeds, fertilizers and pesticides;
 - * tractors (although in wadi Khirr the cooperative had to rent tractors from private farmers in the village);
 - * spare parts for equipment.
- The cooperatives have an annual plan of production for a certain surface of the cooperative fields. Farmers are not free to choose crops themselves. If they have more land within the cooperative they are free to choose the crops for these lands.
- The farmers are assured of selling the yields of the crops planted according to the production plan.
- Members must pay a fixed share of their yield to the cooperative. The percentage paid depends on the amount of services given, ranging from 10% to 20%. (e.g. In wadi Bayhan 20% of the yield is paid to the cooperative because the agricultural land has been completely prepared and serviced by the government. In wadi Khirr 10% of the yield is paid to the cooperative because the agricultural land has been partly prepared and serviced by the government with help of the people).
- The price paid to cooperatives is far less than the prices that were paid to landlords.

Advantages related to the socialistic policies of the government are:

- Very high standards of basic social infrastructure: every child over 7 years of age has the opportunity to go to school as there is a public transportation system for children living in villages with no school.
- A developed system of free medical health; there are several health centres throughout the muderiya and hospitals in the main towns. Every health centre is also visited every month by an official doctor.
- Most of the villages are equipped with public electricity and public water schemes.

The disadvantage of the socialistic system in this cultural area is that boys and girls are supposed to attend classes together. As parents expressly asked for female teachers for their girls, almost no female child attends school. Nevertheless in Bayhan town, there is a school with 10 male and 2 female teachers. These female teachers, just like their male colleagues are supposed to have mixed classes.

e) Remittances

An important difference between former North and South Yemen was that emigration (with permission to return home) was not permitted in former South Yemen. Certain people managed to do so by obtaining a North Yemeni passport. But as the border was closed till a few years ago it was extremely difficult to return home at all. Therefore the emigration rate was lower resulting in much less remittances compared to former North Yemen. On the other hand it was much easier to find an administrative job in the cities of former South Yemen, because:

- the governmental apparatus was relatively big;
- the level of education was on average much higher than in former North Yemen.

But it was noticed that the inhabitants of former South Yemen (in the study area) have less cash money in absolute terms. Nevertheless, with cash crops and the much higher intensity of agricultural production, people manage to have quite good living standards.

A striking difference between the former two Yemens is to be found in housing construction. The high percentage of mud houses to be found in former South Yemen, compared to the high percentage of stone houses in former North Yemen, is thought to be a result of less remittances there.

f) Agricultural potential

The agricultural office of Bayhan muderiya claims that 100.000 people live in the muderiya. It was not possible to give a realistic figure for the total area of cultivated land. The Agricultural Census of former South Yemen reports that in 1984/85 there were 4527 agricultural households for a total of 37.937 inhabitants which made a living from agricultural activities in the muderiya. Out of these 4527 agricultural households, 2798 were landholders and 1729 were landless. Only 691 people were cooperative members, which leaves 1038 households unaccounted for. (1729 landless minus 691 cooperative members = 1038.) The study team could not find any information about these households, whether they were sharecroppers or belonged to any other type of landholding system. But, keeping the Agrarian Reform of the '70's in mind, this seems most unlikely. The census also figures out a total agricultural area of 11.433 feddan for Bayhan muderiya.

The population data (37.937 inh.) and the amount of cultivated land (11.433 feddan) mentioned in the census approximates the estimation made by the Bayhan Agricultural Development Project which the study team visited in Nuqub. According to the responsible person in charge of this project, there are 35,000 people living on agricultural lands. (Total population of Bayhan muderiya is 60,000. Of this total, 10% is nomadic and 15% is urban population.) The total surface of the muderiya is about 50,000 feddan (=21,000 hectares). But the useful agricultural land is only 13,000 feddan (5460 hectares). That means that the man/land ratio is more than 1 hectare per household. Despite this small surface, the muderiya was self-sufficient till 10 years ago with selfsupporting crops like: sorghum, wheat, barley and sesame. (Except in wadi Harib because sorghum is not salt-tolerant).

It was noticed that in the former South Yemen most of the agricultural suitable land was cultivated. These cultivated lands are mainly found on ancient terraces. Despite the fact that a number of men are

working abroad, there is no lack of labour for agriculture.

Bayhan muderiya historically was an important area for "elb" tree production (*Zizyphus spina christi*). The wood of these trees seems to be of very good quality and was much used for construction purposes. Nowadays elb trees are mainly to be found in wadi Harib. Since the development and import of modern construction materials, elb trees have less importance today. It was noticed that the elb trees in lower wadi Harib were suffering from lack of water, due to a lowering of the water table.

The Bayhan Agricultural Development Project in Nuqub commenced in 1982. It was a project for the whole area and was aided by the International Fund for Agricultural Development (I.F.A.D.), the A.I.D.A. and government funds. This project has most of its activities in domestic waterschemes, land and water conservation, boreholes and shallow wells construction/exploitation. The first stage of this project came to an end in 1988 and there is a foreseen consultancy by the World Bank to assess the possibilities to start a new phase.

g) The future of the society after reunification

There is a foreseen period of two and a half years since reunification for the two political, social and economical systems to adjust. Nevertheless, most of the cooperatives suffer from a lack of money. Therefore the number and quality of the official services offered by the cooperatives are decreasing. For instance, the production can hardly be marketed by the government and the free market is not yet well implemented. (e.g. it was reported in one of the villages of wadi Khirr that the entire onion-harvest had rotted away because of this situation). The lack of money also endangers the credit system, which was most appreciated by the farmers. Thus members of the cooperative started to feel that the share they have to pay (10% - 20% of the yield) is rather expensive. For the last 20 years they estimate that they have paid back the government for what it had done during the installation of the cooperatives.

Due to the reunification the borders are opened completely. Many former landlords who left after the agrarian reform, reclaim "their" lands. This can threaten the situation of the present cooperative members.

Moreover, many people in Bayhan muderiya express their fear that due to a lack of money, the present government will probably not be able to maintain the present social infrastructure in the former South Yemen. (Especially public transportation for school children and public electricity for most of the villages).

3) Summary

Rangelands

Main features of the rangelands:

- The rangelands can be considered as a homogeneous entity in the nahiyas and muderiyas considered;
- The population density is very low; most of the people are nomads;
- There is hardly any agricultural potential; only livestock keeping is feasible;

- The accessibility to these areas is very difficult ;
- Basic social infrastructure is weakly developed.

Wadi Bayhan catchment area

Main features of upper wadi Bayhan "wadi Al Ghayl" located in Mashwarah nahiya (from the upstreams part down to the former border):

- The area is owned by one family;
- The area is scarcely populated, most of the inhabitants are nomads;
- The area is regularly affected by floods which have damaging influences;
- There is little suitable land for agriculture (about 100 hectares);
- The area is difficult to reach.

It is concluded by the study team that the agricultural potential in the area can be developed. But for reasons mentioned above it is not feasible for second phase study. The area is too small and too scarcely populated.

Main features of wadi Nahar (mid wadi Bayhan) located in Bayhan muderiya (from the former border down to Bayhan town):

- Presence of agricultural cooperatives as well as private landowners;
- Most of the suitable arable lands are cultivated in this area (90%);
- This area benefits the most from the flood water compared to the other areas taken into consideration as hardly any water is used upstreams;
- There are mainly shallow wells and the groundwater table is considered to be stable;
- The Bayhan Agricultural Project stimulated land and water conservation measurements;
- According to the study team this rural area is the most densely populated of the areas considered during this field trip;
- The area is accessible from the city of Bayhan. From the south the area is difficult to reach;
- Basic social infrastructure in this area is well developed.

It is the opinion of the team that a new small scale integrated rural development project should not be in concurrence with an existing agricultural project. Therefore this area will principally not be included in the second phase.

Main features of the lower wadi Bayhan, located in the Bayhan muderiya (from Bayhan town down to the downstreams part of the wadi):

- Presence of agricultural cooperatives, state farms and little privately owned lands;
- Floodwater incidentally reaches this area as it is mainly intercepted upstreams;
- The water table is considerably lower than in the upstream areas and decreasing. Therefore there are much more boreholes than shallow wells;
- The area is better accessible from the north than from the south;
- The basic social infrastructure in this area is well developed. The city of Bayhan is the main service centre in the area.

Main features of wadi Khirr located in Na'man nahiya. The boundary before reunification used to divide wadi Khirr into: Na'man nahiya (one third of the cultivable part of the wadi) and Bayhan muderiya (two thirds);

- All the land is privately owned in Na'man nahiya;

- Not all the land suitable for agriculture is cultivated;
- Occurring floods can damage the lands. Only small scale protective measurements exist;
- Irrigation water is used from shallow wells only and is good both in quality and quantity;
- The area is hardly accessible from the south and reasonably accessible from Bayhan town;
- The basic social infrastructure is less developed.

Main features of wadi Khirr located in Bayhan muderiya:

- Presence of cooperatives and private land;
- It seems that the cooperatives provide less services to the farmers compared with other areas in the muderiya;
- The Bayhan Agricultural Project has not been so active in this area;
- Problems of the quality of the water in certain wells (salinization) were mentioned by inhabitants. This resulted in expansion of the surface planted with salt-resistant crops;
- Salinization also affects the available quantity of the water;
- Most of the wells are shallow wells;
- The area is hardly accessible from the south and reasonably accessible from Bayhan town;
- The basic social infrastructure is well developed.

Wadi Harib catchment area

Main features of wadi Ayn located in Bayhan muderiya (upstreams wadi Harib):

- Presence of cooperatives and private lands;
- The farmers were satisfied with the functioning of the cooperatives;
- The Bayhan Agricultural Project focussed attention on this area. The water from floods is completely regulated by dams and sluices which are clearly visible in the field. Nearly all the floodwater is retained in this area for agricultural use;
- Mainly shallow wells;
- The people mentioned problems with salinization of soils situated further from the wadi bed;
- Only accessible from the north and not from the south. The formerly important Mablqah pass is not accessible for vehicles anymore.
- The social basic infrastructure is well developed.

The study team was not able to visit wadi Ablah located in Marib province which forms part of the wadi Harib system.

Main features of wadi Harib located in Bayhan muderiya and Marib province:

- The boundary before reunification criss-crossed wadi Harib. Therefore the two agricultural systems exist next to each other;
- Not many activities developed by the Bayhan Agricultural Project were observed in the area;
- Flood water from upstreams wadi Harib does not reach the downstreams areas anymore because of the expansive dam-system in wadi Ayn;
- As the water table drops, boreholes outnumber shallow wells;
- A decreasing water quality from wells and boreholes was mentioned;
- The area is well accessible from the North and not accessible from the south;
- Harib town is the main service centre for the area;

- The level of the basic social infrastructure is determined by the former border.

VISIT TO DHI NAHIM NAHIYA, AL BAYDA NAHIYAS AND LOWDAR MUDERIYA (MUKEIRAS CENTRE, 25/10/90)

1) Al Bayda and Dhi Nahim nahiyas

The administrative entities of Al Bayda and Dhi Nahim nahiyas lie at an average altitude of 1200 - 1500 meters. According to the satellite photos, not many agricultural activities take place in this area. The main exceptions are to be found along the tarred road. The crops grown in these fields are supplied to the main settlements: Al Bayda town, Dhi Nahim town and Mukeiras town.

Rainfall is low but no reliable meteorological data has been collected for the area located in former North Yemen. However in Mukeiras centre, which is located just 30 km east of Al Bayda town, more reliable meteorological data has been collected throughout the years. This data could apply for the surrounding areas. Most farmers do not rely on the rain for agricultural activities. They rather irrigate their crops with water from shallow wells and since several years boreholes are also used for irrigation. It is of importance to realize that off-farm employment and remittances from emigration have contributed much more to the income-level of this area than the agricultural activities.

According to the 1982 - 1983 "Study into Water resources in Al Bayda Province", enough water could be extracted in the two nahiyas at the time, to allow further development of irrigated agriculture. However, eight years have passed in which enormous amounts of groundwater have been extracted. This certainly has had consequences. Without any updated, reliable data, the study team thinks that these areas are not suitable for further development of irrigated agriculture in Al Bayda province. It is not the objective of the Inventory Study team to choose priority areas which can only improve the agriculture by affecting the groundwater level in a negative way. This could in the long run lead to many more problems. Besides the study team has found it wiser to concentrate on areas within Al Bayda district which lack information.

Al Bayda town is the capital of the province, therefore social infrastructure in these two nahiyas are of a much better standard and level than in areas which are situated further away from the capital. For instance physical infrastructure is quite good due to the main tarred road from Sana'a to Al Bayda (by way of Dhamar and Rada), several feeder roads in good condition (of which some have been constructed by the R.I.R.D.P.) and the presence of an airstrip in Dhi Nahim town.

2) Mukeiras Centre

For this report supplementary information was used from a study: Min. of Agriculture and Agrarian Reform, Aden. Feasibility study for Integrated Rural Development of the Middle Plateau Area in Louder - Moudia - Mukeiras - Deran - Guishaan, March 1987.

Mukeiras centre and town are located in the South-East of Al Bayda district. It has an airstrip, a military post and a small state farm. The population of Mukeiras town is about 5000 people. In the whole area the

number of inhabitants was said to be 25,000. A considerable number of men (>30%) works/worked in the Gulf-States as it was not difficult to obtain a North Yemeni passport, although returning to South Yemen was rather more difficult. At the moment many people are returning from the Gulf due to the crisis. This also means that the remittances are decreasing.

Topographically the area consists of a plateau with valleys and shallow depressions. The majority of these depressions lie in terraced patches and the surrounding, scarcely vegetated hills. The hills are skillfully managed to harvest rains and divert runoff into the arable land. Interception canals are dug along the hill sides and low alternating diversion walls are constructed from the top to the bottom of the hills to control the water. The water harvesting efficiency is high compared to surrounding areas.

Agriculture in this area is mainly rainfed. If irrigated agriculture takes place, water from shallow wells is used. The quality of the water and the soil is felt to be good but both are lacking in quantity which is a severe constraint. There are no boreholes in the area. It was mentioned by the farmers that a lack of rain during the last two years resulted in a drying up of some shallow wells. Irrigated agriculture depends heavily on groundwater, spate irrigation is not practised due to topography. In times of drought the groundwater level decreases but recharge takes place every 3-4 years due to heavy floods. As a result the water level is considered to be stable in the long run. As reported by farmers a good rainy season will provide enough water to support a crop for two consecutive seasons of poor rains (1987). The last two years have been characterised by a lack of rain resulting in cultivation of the arable lands for about 20% only.

Table 1 - Mukeiras cooperative

	Feddan	Hectare
Area under rainfed and spate agriculture	6340	2536
Area under well irrigation	1875	750
Total cultivated land	8215	3286
Uncultivated arable lands	--	--
Grand total of arable lands	11,000	4400

Table 2 - Number of wells in Mukeiras cooperative

Operating handdug wells	919
Operating tube wells	-
Nonoperating handdug wells	-
Total number of wells	919
Number of cooperative members	2600
Tractors	154

source: PDRY, Min. of Agriculture and Agrarian Reform, Aden. Feasibility study for Integrated Rural Development of the Middle Plateau Area in Louder - Moudia - Mukeiras - Deman - Guishaan, March 1987.

Crops grown in the whole area are sorghum, wheat, barley and a little alfalfa. Besides, in the valleys vegetables (potatoes, carrots, cabbage) and fruit trees (peach, pomme-grenade and grapes) are also grown. It was mentioned that former generations were self-sufficient with grain production. Nowadays the area is not self-sufficient anymore because:

- a certain part of the arable area is planted with cash crops;
- the number of inhabitants has increased.

Priority is given to food crops, although, according to the 1987 study, the Mukeiras area has been highlighted as former South Yemens vegetable production centre during the summer months. The former South Yemen government established a National Seed Potatoe Programme in Mukeiras. No qat is grown as it was not allowed before reunification. At present the farmers hesitate to grow qat because the presence of a market for this product is uncertain. Furthermore it is a water consuming crop.

Table 3 Areas planted with vegetables and the respective quantities delivered to marketing through the cooperatives in Mukeiras for the year 1983/1984

Crops	Feddan	Tons
potatoes	1438	8532
tomatoes	458	2929
onions	133	683
carrots	50	299
cabbage	20	101
lettuce	33	130
TOTAL	2132	12,674

source: PDRY, Min. of Agriculture and Agrarian Reform, Aden. Feasibility study for I.R.D. of the Middle Plateau Area in Louder - Moudia - Mukeiras - Deman - Guishaan, March 1987.

Most of the land, tractors and shallow wells are privately owned. Dependant on the location of the wells they may be shared by several farmers. Tractors are hired out to other farmers. The yields used to be sold to the cooperative at fixed prices. Nowadays one is free to choose to whom yields will be sold. Services rendered by the cooperative are negatively affected by insufficient technical and administrative staff. Members of the cooperative pay 10% of their yields to the cooperative.

There is not much livestock in the area. Grazing capacity is very marginal. Basic social infrastructure in the area is reasonably to good. All houses are connected to a water scheme which is installed and paid by the people themselves. Electricity is public, every house is connected and there are meters to measure the use. The minimum price per month is 20 YR (1 kilowatt costs 1 YR). There are several primary schools in the area and a secondary school in Mukeiras town. The primary school in Barkhan area is attended by 600 pupils in 2 shifts, of which 30% is estimated to be gir's. 22 Yemeri teachers of which 4 are women teach at this school. Public transportation for school children is provided by the government. Some villages have clinics and Mukeiras has a health centre but still medical care is considered to be insufficient. A new road is under construction from Mukeiras to Lowdar by the Chinese (who are paid in oil). From Al Bayda town the area is reasonably accessible by a dirt road.

VISIT TO YAFFI MUDERIYA IN LAHAJ GOVERNORATE (26-27/10/1990 AND 1-5/11/1990)

1) Yaffi muderiya

Yaffi muderiya is located south of Al Bayda district. The total surface is estimated at 600 km². Administratively Yaffi is divided into four centres:

- Al Had centre with the main town of Bani Bakr and a total number of agricultural inhabitants of 25,531 (agricultural census, 1984);
- Yahar centre with the main town of Sawayda and a total number of agricultural inhabitants of 29,882 (agricultural census, 1984);
- Maflahi centre with the main town of Al Jurbah and a total number of inhabitants is 35,000 according to the agricultural officer;
- Labus centre with the main town and capital of the whole muderiya Hajar Al Labus and a total number of agricultural inhabitants of 64,772 (agricultural census, 1984), and with a total number of people, as estimated by the agricultural officer (1990), of about 90,000.

The boundaries between the centres are unknown. Therefore subdivisions of the muderiya are based on topography only. The capital Hajar Al Labus is certainly bigger than Al Bayda town. According to the agricultural census the total number of agricultural inhabitants was 120,158 in 1984. It was mentioned by the authorities in Hajar Al Labus that the number of people today is about 184,000. Resulting from these figures it can be concluded that a large number of people is working in non-agricultural employment but the exact number is not known.

The population density for the whole muderiya is estimated at more than 200 inhabitants per square kilometer in 1990. This density is very high when compared with the nahiya's in Al Bayda district.

The average number of emigrants in this area is not known. It was estimated by the study team that the percentage of adult men who are working outside Yaffi varies from 10-90% in the different villages. The agricultural officer mentioned that the amount of land is not enough for agriculture and that for a living people also rely on off-farm activities: construction, retail trade, carpentry and a small percentage is working for the government.

In the muderiya only marketing cooperatives exist. According to the situation before the reunification, cooperatives are predominantly involved in the marketing of coffee. However, it was also mentioned that small quantities of coffee were sold on the private market. On a minor scale the cooperatives are in charge of the distribution of inputs like credit, fertilizers and pumps. They provide certain inputs like fertilizers and insecticides at fixed prices which is 25% less than the market price. But complaints about the provisions of these inputs were noticed in most of the villages visited. All the land in the muderiya is privately owned and state farms do not exist. The head agricultural office is in Hajar Al Labus with a substation located in all centres. In some areas the farmers were complaining about the functioning of the agricultural services.

The area can be reached by two main roads. From the north-east the muderiya can be reached within one hour from Al Bayda town, (Hajar Al Labus within 3 hours). From the south-west the muderiya is accessible from Al

Habilayn by a tarred road to Al Askariah. From Al Askariah a new road is under construction by the Chinese; presently it is a 2½ hour drive to Hajar Al Labus. Most of the villages can be reached by roads, but they are bad throughout the area; average speed is 10 -15 km per hour. Some areas bordering the plateau are not at all accessible by car.

The Yaffi muderiya can be divided into several topographical regions: two plateaus with an average altitude of 2100 meters and several wadi's which belong to two main catchment areas (Bana and Sulub catchment areas). In between the plateaus and the wadi's are rangelands. The wadis Hatib, Thool and Yahar are flowing in south-western direction and have their outlets in wadi Bana. The wadi's Dhi Nakhib and Am Mansur flow in south-eastern direction into wadi Sulub. The average annual rainfall is estimated to be 300 mm, based on rainfall figures from several stations in the surrounding areas.

Agriculture on the plateau is mainly rainfed. The main crop grown is sorghum. In the wadi's, use is made of irrigation to grow coffee, which is the dominating crop in the wadi's. It was not possible to get a good idea about the total area under cultivation. The area under cultivation as estimated by the study team does not harmonize with the figures from the agricultural officer of Hajar Al Labus. For example, the total surface cultivated in wadi Yahar amounts 5,300 feddans (2120 hectares) according to the agricultural officer, while the studyteam estimated that the cultivated area in wadi Yahar is about 250 feddans (100 hectares). The agricultural officer probably mixed the cultivated area in wadi Yahar itself with the Yahar centre which is much bigger.

A specific characteristic of Yaffi muderiya is the fact that external interference started only recently. People rely mainly on their own resources. For example, it was explained that primary schools in the muderiya are paid by the people themselves. In this way 88 primary schools were started and run. The government paid for the secondary and highschool, both located in Hajar Al Labus.

a) **The rangelands**

The rangelands are mostly located on the slopes in between wadi's and the plateau. This unit can be characterized by its steep slopes which are used to graze cattle/livestock only. Hardly any cultivated fields occur. The rangelands are scarcely inhabited and are considered to have no agricultural potential.

b) **The plateaus**

In fact two main plateaus can be distinguished. Together these plateaus cover more than half of the total muderiya. A relatively small plateau is located north of wadi Hatib. On this plateau Al Had centre is situated together with its capital Bani Bakr. This northern plateau is not visited and therefore it will not be included in this report. The plateau south of wadi Hatib has the centres M'clahi and Hajar Al Labus.

Southern plateau

The orientation is southwest-northeast and this area is located in between wadi Hatib in the north-west and wadi Yahar in the south-east. The topography is not like the name plateau suggests as it has a hilly character. The altitudes vary from about 1800-2400 meters. When visiting the plateau the percentage of terraced land is strikingly high and in general very well maintained.

Agriculture in this area is mainly rainfed. For food crops the area is not self-sufficient at all and cash crops are hardly grown. The crops grown are firstly 80 - 90% sorghum, secondly qat, thirdly maize and on very small scale millet, barley, alfalfa, fruit trees and vegetables.

There are no boreholes, only shallow wells exist. There are 120 wells for the whole Muflahi centre. The water from shallow wells is mainly for domestic use. Water was remarkably often fetched from the shallow wells by hand and transported over long distances by women and donkeys. It is felt that there is not enough water from the wells for domestic use. In Muflahi centre the situation of water for domestic use is reported to be very bad. Not enough water is available and there are many quality problems. It was mentioned that the bad quality of the water results in the occurrence of cancer problems among the inhabitants. In other villages people related the high occurrence of kidney problems to the water quality (Marfad area).

Many wells run dry during the year but are mostly replenished if there is enough rain. However, it was mentioned that sometimes drinking water has to be fetched by truck from other places within the muderiya. The decrease of the water level in the shallow wells is related to less rain in the past years and the earthquake of 1982. In several places the presence of well maintained water harvesting systems mostly in combination with cisterns were noticed. The water from the cisterns is not used for drinking water. The quality of the soils is considered to be good except for the lack of water and its quality.

There is little livestock in the muderiya. Every family owns some livestock for domestic use only. It was noticed that donkeys are often used to fetch and transport the water for domestic use.

Most of the villages on the plateau are connected to the public electricity scheme. In villages not connected to the scheme some households own a generator and rent the electricity to their neighbours (26 YR per lamp per month). The health facilities in Hajar Al Labus and the rest of the plateau are felt to be insufficient. Concerning education and health this town fulfills a central role for the muderiya.

Considering the educational situation in Muflahi centre the following figures were collected. There are 18 primary schools in this centre with 181 male teachers and 1 female teacher. In total these schools are attended by 4,823 pupils. About 40% of the girls attend school. Public transport is available for children to attend school. It was told that the furthest distance children have to walk to catch the public transport or to walk to school is 1 kilometer. There is also one secondary school in Al Jurba with 5 teachers, 100 boys and 5 girls. But most of the students go for secondary education to Hajar Al Labus (45 minutes by governmental bus).

c) Wadi Hatib

Wadi Hatib flows in west-south-westerly direction into wadi Bana. It is 33 km long from the beginning to where it meets wadi Bana. The cultivated area in the wadi is about 18 km in length and about 150 hectares in surface.

According to some residents about 20.000 people inhabit wadi Hatib. The study team suspects this to be an overestimation. During the visit it was calculated that the number of schoolchildren, the number of villages and the average number of families per village could not make a total number of 20.000 inhabitants possible. 24 Villages were named for the length of the wadi, situated on both sides and not far apart from each other. Wadi Hatib is not named separately in the agricultural census of 1984 and therefore an exact population figure cannot be given as yet.

Upstreams wadi Hatib

In the upstreams part of wadi Hatib there are less emigrants than downstreams. The study team thinks this is a result of the favourable agricultural potential of this area. From the beginning of the wadi, which is marked by a spring until Al Atff (which means the Bend) there are 5 villages. This area, an estimated 60 - 90 hectares, is nearly completely cultivated with coffee plants. Less than 5% other crops are grown by the inhabitants (sorghum, wheat and barley) which automatically means that they must import food and other goods. Coffee is strongly preferred because of various reasons. The quantity of the water is sufficient to guarantee good yields and the climate is ideal for growing this crop. Keeping in mind that this area used to be located in former South Yemen, it is not remarkable that coffee production dominates in the wadi. Qat cultivation was prohibited and the coffee yields could always be sold to the marketing cooperative.

Most of the irrigation water for the coffee is gained from a spring at the beginning of the wadi. All the water from this spring is skilfully caught in a cistern. The distribution of the spring water is fully regulated and only the villages in the coffee growing area benefit from this easily accessible source. In case of floods, the water is harvested by means of a traditional and complex water diversion system.

All the suitable land for agriculture is located on very well maintained terraces and all of it is indeed used for agricultural activities. The land is privately owned and there is enough labour available to sustain the prevailing agricultural system. The work is all carried out by hand. It was mentioned that the average cultivated area per family in upstreams wadi Hatib is about 1 feddan (= 0.42 hectare) and the average coffee yield is between 150 - 200 kg per feddan (= 600 - 1000 kg per hectare). The amount of coffee harvested depends on the depth of the soil in the terraces.

People also use fertilizers for the coffee, while manure is used for other crops. The total coffee yield used to be sold to the marketing cooperative for a price of 4 Dinar per kg (= 104 YR). It is believed that coffee can be sold for higher prices in the free market. Livestock keeping in the wadi is not worth mentioning 2 or 3 sheep per person and 1 cow per family.

Downstreams wadi Hatib

As mentioned coffee cultivation virtually disappears after the village Al Atff. Two reasons, which are linked, can be found for this phenomenon:

- * according to the farmers the coffee plants are destroyed by insects which affect the roots or the new leaves.
- * the downstreams area of the wadi is too low in altitude to allow the coffee plant to grow well.

Because coffee is an attractive cash-crop the farmers in this part of the wadi try to find solutions to the problems they have with cultivating coffee. The study team was told that they had once tried to treat some coffee plants with insect spray. The result however, was that the plants dried out completely within a matter of days. Nevertheless, the farmers are still eager to find ways to cultivate healthy coffee. Instead of coffee, the farmers grow nearly all sorts of grain common in the area, except wheat. The climate is too warm for wheat production. On irrigated land crops are grown all year round; after the sorghum harvest, maize is planted. Also tomatoes, potatoes and onions are grown in the winter season. Oranges are the main fruit grown in downstreams wadi Hatib. The area is not self-sufficient and the inhabitants have a difficult time making ends meet. Surplus harvest of grains seldomly occurs, only cashcrops are sold to the marketing cooperative. The team noticed many fields in which the sorghum stalks still stood (without the grain) and served as structures for bean plants to climb in.

Like upstreams, all the land is privately owned. The farmers mentioned that each family has about 3 habl on average which equals one quarter feddan. Around the village Al Hawa, there was a total area of 160 habls = 15 feddans (\approx 6,3 hectares) of arable land. Water from the spring upstreams does not reach this area anymore. People make use of shallow wells for irrigation purposes and for domestic use, but crops are only irrigated during the dry seasons of the year. Ownership of land automatically means that the farmer also has a right to the water from the shallow wells. According to the people the quality of the water is satisfactory and the level in the wells is stable.

The agricultural activities in the upstreams and downstreams area of the wadi differ to such a great extent that this subject has been treated separately for the two areas. The basic social infrastructure can be applied to all of wadi Hatib.

Electricity in wadi Hatib is scarce, especially in the downstreams areas. When it is present, the generator is privately owned. People can rent the electricity for 130 YR per month for 2 lamps and one television. There are 3 primary schools which are attended by about 600 boys. Only very few girls attend school because of a lack of female teachers. Each school has 7 male teachers. Some villages also have a first and second grade located in the village. The reason for this is that the children who attend these classes are too young still to walk long distances. For a secondary school, pupils must go to Hajar Al Tabus or another town far away. There seems to be a health centre building in the wadi, but as there is no staff and no facilities, it can not be regarded as a proper health centre.

Accessibility to the wadi from the north is good. The road which leads down into the wadi from the plateau is not too steep. The main problem with the road is that after each significant flood the road must be completely rebuilt. The study team estimates that the wadi is not accessible for about a week after a flood. To the south wadi Hatib meets wadi Bana in which a perennial stream flows. The road cannot continue in the wadi because of the stream, therefore it follows the mountains to the west of the wadi.

d) Wadi Thool

Wadi Thool originates from the south-western part of the plateau. The length of the wadi is 15 km and drains in south-westerly direction into wadi Bana at an altitude of about 700 m. It has a small catchment area, which is approximately less than 40 km².

It was not possible to enter the wadi by car as there are no roads. A road down into the valley is at the moment under construction by the people themselves. A small donation for this road is given by the government, while most is paid by the inhabitants. Every family must pay 10,000 YR. Poor families who cannot pay this amount of money, but who have an emigrant family member, must pay 5000 YR. If there are no emigrants in the poor families they have to pay in kind, by labour. The road starts in Habil Al Jabr and has been under construction for 5 years (roadlength already finished: 19 km). It is expected to be finished in 4 to 6 months.

The number of inhabitants in this wadi was told to be 7000. Villages do not exist, people live scattered throughout the wadi. It is said that every family has one member working in off-farm employment. Of this number 127 people are emigrants working outside Yemen.

All land is privately owned but the area cultivated is unknown. Each family has on average 3 - 4 feddan. The area is not self-sufficient and agriculture is mainly rainfed. Some lands are irrigated with floodwater, on average once a year. The main crops grown are: millet, sorghum and maize. Furthermore qat is grown, sesame, banana, and papaya. The most important cash crop is coffee of which the relatively small surplus is sold to merchants. Coffee has never been sold to cooperatives. Many crops grown in the wadi are marketed locally. Besides a lot of food is bought from the cooperatives. For agriculture no tractors and fertilizer are used. However use is made of manure.

In the area there used to be about 70 shallow wells which are dried up nowadays. However, one of them is replenished after sufficient rainfall. For drinking water, people are completely dependant on springs. The water of wadi Bana cannot be used by the people of wadi Thool, because this area is owned by other families.

Livestock is kept for domestic use and consists of: sheep, cows, camels and donkeys. Beehives are also zooming around. The camels are used for transportation because of a lack of cars.

Concerning basic social infrastructure the following can be said: There is no electricity present. In the wadi there are 3 primary schools attended by 550 pupils in total. About 40% of the girls attend school. There are 10 teachers for these schools. For the children there is lack of

transportation and therefore some of them must walk up to 3 hours. For basic health services the area is equipped with a small clinic and one nurse. But for higher level services (secondary school and health) the population is oriented on Hajar Al Labus and Radfan muderiya which is located south-west of Yaffi muderiya.

e) **Wadi Yahar**

Wadi Yahar, draining in south-westerly direction, has a total length of 47 km. The origin is at an altitude of 2000 m while the outlet into wadi Bana is at an altitude of ± 700 m. Figures about the number of inhabitants and off-farm employment (emigrants) for the wadi are not known. Based on agricultural activities and population density the wadi can be divided into two parts. The total area cultivated is estimated at 70 hectares.

A new road is under construction in wadi Yahar. The consequences are felt/expected to be the following:

- the farmers were told that they would be compensated for their losses, but they do not believe this to be true;
- in several places this new road results in the narrowing of the wadi bed. Consequently the force of floods will increase in these parts. If no protection measurements will be taken the terraces might well be increasingly damaged in the future;
- Because the discharge of the flood will probably increase, less water will infiltrate. In this case, the recharge capacity of the groundwater will decrease;
- in the whole wadi terraced land has been confiscated or will be confiscated in the future to make way for the road;
- In some places concrete walls are constructed to protect the new road. This benefits the fields in the protected area.

Upstreams wadi Yahar

The upstreams part (length 20 km) can be characterized by many villages and about 80% of the cultivated area (± 60 hectares). This is also the area where most of the coffee is grown. Although part of the coffee is grown on rainfed basis, the greater part of it is irrigated. Other crops grown are foodcrops and some qat. The number of shallow wells is limited. There are villages without shallow wells. For water use these villages are dependent on neighbouring villages from where the inhabitants buy water for domestic use. The price paid amounts to 3 shillings (about 4 YR) per person each month, children included. This is for example the case in the Suwayda area. People told that lack of money was the main reason for the absence of a shallow well. Due to the average depth of the water level in the shallow wells (30-40 m) use is made of pumps. All shallow wells are protected by means of concrete construction against the damaging influence of floods. Considering the quality of the water it was noticed that in some cases chloride tablets were used to purify the water. A sorrowful contradiction was noticed between two neighbouring villages concerning water availability. One village has enough water for irrigation and has even a surplus which can be sold. Costs are paid for pumping and not for the water itself. Furthermore the inhabitants are able to maintain their terraces while the other village must buy water for domestic use and is not able to maintain the terraces and irrigate the coffee.

In the upstreams part of this area terraces (up to 8 meters high) are well maintained and new protection walls consisting of large boulders have been constructed by the villages with help of the government. The maintenance of the terraces decreases in downstream direction.

An electricity scheme is present and most of the houses are connected. The social services are concentrated in this part of the wadi. Besides primary schools there is also a secondary school in Suwayda and a health clinic.

Downstreams wadi Yahar

Only scattered families inhabit this part of the wadi. Some families are dependent on day labour for income as there is a lack of land. Mainly foodcrops are grown on a rainfed basis like: millet, sorghum and maize. This is not enough for self-sufficiency. Coffee growing has failed due to root disease. Compared to upstreams wadi Yahar the terraces along the wadi bed are poorly maintained (many walls have been washed away by floods). The inhabitants explained that they do not have the money to repair and maintain the terraces.

Halfway this area there is a source and people are able to cultivate papayas and bananas on a small scale base (1 to 2 hectares). The springwater is generally used for domestic purposes. It was mentioned that some people may have to walk for 1½ hour to fetch water for domestic use. It was said that the groundwater in the wadi is reasonably within reach but people do not have the opportunity to dig a shallow well. People have little livestock. There is no electricity and for basic social services they are dependent on Suwayda except for the primary schools. Some girls attend school.

f) Wadi Bana

Wadi Bana can be characterized by its inaccessibility. Wadi Hatib flows into Bana at an altitude of 1000 m. Wadi Bana continues into south-westerly direction and bends to the south-east after ± 20 km. In the wadi flows a perennial stream. The wadi bed remains small most of the time. Population density is very low and the families live mainly scattered along the wadi. For some areas it was calculated that 4-6 families live along one kilometer of the wadi.

The study team visited several places along the wadi among which the village Agffan. Agffan village in Radfan muderiya has 45 families. The people told that 20 persons in this village are emigrated which can be considered to be a large number. It was remarkable that the village borders the perennial stream of wadi Bana but that the agricultural activities are minimal.

The agricultural fields are located along the wadi. Terraces do not exist and fields are not protected. The topsoil has a sandy texture while the clay content in the subsoil is considerably higher. Manure is used to improve the soil. The farmers plant red sorghum, maize and millet on their small plots (on average 0.2 hectare per family). These plots are irrigated year round by the stream. They plough with cows as there are no tractors. The villages are not self-sufficient. Some extra income is found in selling livestock or in daily labour. In fact the whole area seems to be quite poor.

in many aspects.

The groundwater level under the fields along the wadi bed seems to be rather close to the surface. This was deduced from the fact that fallow fields carried a lot of vegetation. It was even noticed that on some fields water was stagnating. It was told by the farmers that many floods a year occur. The farmers complain about the loss of harvests which are washed away by floods. During the rainy season (March-July), when floods occur, it is not possible to grow crops at all along the wadi.

The cooperative in this area does not seem to work well anymore. The farmers complain about a lack of services. There seems to be a shallow well in the wadi but according to the farmers it is blocked. Therefore people use the water from the stream also as drinking water. The farmers complain about diseases (including malaria) and about a lack of health care and medicines. To reach a health centre they must rent a car (about 1000 YR) and drive for 6 hours to reach Hajar Al Labus or another health centre in Radfan muderiya.

The primary school has first grade only for boys and girls. There are 30 pupils and 1 teacher. After this grade the children do not go to school anymore. Furthermore there is no electricity at all in the villages. Accessibility from the north depends on the condition of the wadi Hatib road. It is also a long distance. From the south it is difficult to reach this area without 4WD vehicles.

g) Wadi Dhi Nakhib

In the wadi Sulub catchment area, wadi Dhi Nakhib was visited. The wadi discussed in this report is the part of wadi Dhi Nakhib located in Yaffi muderiya. The length of wadi Dhi Nakhib within the Yaffi muderiya is about 20 km and drains into south-easterly direction. It finds its outlet in wadi Sulub in the Lowdar muderiya. The altitude of the wadi in the study area decreases from 2000 m to 1000 m. There are 13 villages but the number of inhabitants is not known. In one village with 40 families (± 400 inhabitants), there were 30 emigrants.

The cultivated surface of Dhi Nakhib is estimated to be about 60 hectares. 95% of the area is under coffee cultivation. the remaining surface is used for qat and foodcrops. The coffee of this wadi is considered to be one of the best qualities in Yaffi. It was told that the yield is up to 4 kg per tree. It is not known if this is the fresh or the dried weight. On average about 240 trees are planted on one feddan. An average yield of 2-3 kg per tree results in a total yield of about 1500 kg per hectare. The greater part of the coffee is irrigated with water from shallow wells. During dry years when the wells run dry, water for irrigation is transported by truck from the surrounding areas. This way of irrigation takes place 6 to 7 times in dry years. The price for a truckload of water is 650 YR. With this water 10 trees can be irrigated. On average, it is estimated that the price of irrigating one tree in a dry year is 100 YR. In years with sufficient rain 6 to 7 floods occur (1 meter high). It is striking that elb trees are grown in between the coffee trees. The presence of the elb trees together with the narrowness of the wadi are considered to be favourable for the micro climate of the coffee. In former days the elb trees were planted to feed the camels. The number of coffee trees per family varies between 30 - 200 trees. Several households may have trees in

the same fields. Remarkable was the age of the coffee trees: up to 100 years old. Another striking fact was that the distance between the trees was rather small (1 to 1½ m). Problems are faced with insects affecting the coffeebeans and leaves. It is said that 25 to 50% of the yield is lost as a cause of diseases. People try to control this by removing the plants from the soil and to replace the surrounding soil. This is not thought to be an efficient method, but there is no alternative at the moment. All the coffee was sold to the marketing cooperative in Humhama at a price of 52 YR a kilo before the reunification. Mostly manure is used for coffee and incidentally fertilizer is used.

In case of severe floods many terraces are damaged and the soil is washed away. For instance the flood of 1982 washed away about 5000 coffee trees (± 20 hectares!). The terraces are on average 3 m high in the upstreams part of the wadi. In one village it was mentioned that the terraces and water diversion systems are repaired and maintained once a year on average. For this a shovel is hired at the price of 1950 YR. However, downstreams of Bayn As Siyal maintenance of the terraces decreases in general. However, in this area several new walls were noticed, by whom they are build is unknown. These walls consist of boulders. They protect existing fields and fix sediment for future agricultural use.

Since 1984/85 most of the villages are connected to the public electricity scheme which was started by the inhabitants and taken over by the government. Every emigrant paid 6500 YR for installing this scheme. Shallow well construction and pump installation costs 195.000 YR in total; it is paid by the villagers. There are 5 primary schools in the whole wadi with public transport for the children. Practically all girls attend school. In the village of Al Jarf there is a pharmacy and there are 3 health centre buildings, without any facilities. Therefore the inhabitants rely on Hajar al Labus for all medical services.

VISIT TO NISAB MUDERIYA IN SHABWA GOVERNORATE AND MARKHA NAHIYA
(10-13/11/1990)

1) Location of area visited

The area visited is located north-east of Al Bayda district. Administratively this area is divided in Markha nahiya and Nisab muderiya. Markha nahiya, with the main town Halhal, is located in the north-eastern part of Al Bayda district. Nisab muderiya, bordering Markha nahiya, is divided into three centres:

- Nisab centre with the main town and capital of the whole Nisab muderiya;
- Markha centre;
- Hatib centre which is not included in the study area.

The administrative boundaries in the area visited are unknown and do not coincide with the geographical situation. Therefore the subdivisions of made in this area are mainly based on topography.

Topographically the area can be divided into several regions coinciding with wadi systems. There are two main catchment areas: wadi Markha, with its main side branch wadi Khawrah, and wadi Dura (Nisab region) with its two main side branches wadi Habadan and wadi Hammam. Annual rainfall in the two catchment areas exceeds 200 mm in the south-west and decreases to less than 100 mm in the north-east.

2) Wadi Markha system (in Markha nahiya and Markha centre)

In the total catchment area of wadi Markha more wadi's are included. This aspect is of importance considering the hydrology of the wadi system. Wadi Markha itself originates in the west at an altitude of 1200 m and drains in eastern direction, bending downstreams to the north-east until it drains into the desert at an altitude of 1000 m. The length of the wadi amounts to 70 km and the width varies from 5 to 10 km. One of the side branches visited is wadi Khawrah. This wadi originates from the south-western plateau at an altitude of about 2000 m. The global drainage direction is to the north-east and the length amounts 50 to 60 km. The first part is narrow but the width increases the last 15 km before it drains into wadi Markha. These last 15 km were included during the field visit. In this part most of the agricultural activities take place.

A subdivision of wadi Markha can be made based on the former political boundaries: Markha nahiya (former North Yemen) which covers about 40% of the total surface and Markha centre (former South Yemen) which covers about 60% of the total surface.

a) Wadi Markha in Markha nahiya (former North Yemen)

According to the census the total number of inhabitants was 5515 in 1986. The total surface is 1040 km² and therefore the population density is 5.3 inhabitants per square kilometer. However, the people estimate the total number of inhabitants to be 12,000, which could be a good estimate. They say there are 35 villages in the nahiya. In the upstream part nomads live scattered throughout the area. The villages are mostly located near the wadi beds. Main income is from off farm employment and remittances. It was told that in Markha nahiya 2000 people were working abroad before the

Gulf crisis. In general, one person per two families is working in off farm employment or in Saudi Arabia. This number is relatively high. But, most of the emigrants have returned because of the crisis. In one village it was mentioned that daily labour forms the most important source of cash income (100 YR a day).

The cultivated area irrigated is less than the agricultural area dependent on rainfall only. Striking are the differences in percentages rainfed and irrigated land between villages (from 0-60% irrigated of the cultivated area per village). The total area under cultivation is unknown. Most of the soil on the arable lands are located on old terraces along and also in the middle of the wadi beds. The terraces have a silty texture. They are not at all protected against floods. Main crops grown are sesame, wheat, barley, millet and white sorghum. Incidentally vegetables (tomatoes, potatoes and onions) and qat are grown. In some years it is not possible to grow crops on a rainfed basis due to lack of rain. The area is not self-sufficient. In one village people told that every family owns about 15 goats/sheep for domestic use. Sometimes livestock is sold. A quarter of the families owns 1-3 camels and 20% of the families has 1-2 cows for domestic use.

Boreholes do not exist in the area. Only shallow wells are used for irrigation and domestic water. In Markha nahiya it was mentioned several times that the quality of the water from wells is good in the northern part while the southern part has more salty water. The depth of the water level in the shallow wells is 20 meters on average. Some wells run dry during the dry seasons but are replenished if there is enough rain. It was mentioned in some villages that there are three floods per year on average. Water distribution systems hardly exists.

The study team was told that sharecropping occurs more than usually is thought. About one third to half of the farmers must sharecrop the land the use. The share that goes to the landlord varies depending on the quality of the soil (and not on the yield as usually is the case). Renting of land does not occur, but it was mentioned that when people are indebted to someone, the creditor can take the land and the complete yield for several years.

There is no public electricity although some generators are privately owned. Water schemes are absent. In Markha nahiya there are 8 primary schools but only few of them provide all grades. In total there are about 800 pupils in th nahiya of which less than 100 are girls. The teachers (22 male and 1 female teacher) come mainly from Egypt and Sudan. For secondary school, students (about 200) rely on Al Bayda. In the area is one private health clinic present for first aid. People told that the clinic was built and financed for 75% by the government and for 25 % by the LCCD. The remaining costs were paid by the villagers. Services like medicines are financed by the government but it was told that people have to pay for these services while profit is made by the person who sells them. In this way people felt to be disadvantaged. For higher services one used to rely on Al P. da town but after the reunification people go to A. aq (Shabwa governorate) as well. The general atmosphere concerning governmental help is rather critical.

b) Wadi Markha (in Markha centre former South Yemen)

Markha centre includes midstream and downstream wadi Markha and also the main side branch, wadi Khawrah. In wadi Markha, the midstreams part is highly populated while the lower part has a low number of inhabitants. The population data of wadi Markha centre, found in several sources, vary largely. The total population number ranges from 30,000 to 45,000 while the agricultural census reports a population of 14,169 in agriculture.

There is one marketing cooperative for the centre, located in Al Hujayn that is supposed to represent 80% of farmers. Unfortunately, the data collected for the cooperative seems to be rather unreliable. For instance, the total cultivated land of the members was reported by the cooperative secretary to be 5,300 feddan, while the agricultural census of 1985 mentions a total of 987 feddan. Moreover the cooperative claims 114 wells to be in use by a maximum of six farmers per well. According to this the total number of farmers should be $114 \times 6 = 684$. But at the same time, the secretary claims that there are 6700 members in the cooperative.

The cooperative mostly sells spare parts (for pumps and engines) and seeds to its members and rents out some tractors for ± 70 YR per hour. Another service for the members is a credit system without interest. It is usually paid back in kind. The price to be paid for these services are subsidised for members and not subsidised for non-members. The cooperative receives 10% of the yields from the farmers (one farmer mentioned a price of 25%). A compulsory production plan exists for the members. They must sell their cash crops to the cooperative but are free to sell their food crops to whomever they want. Prices for the cash crops are fixed. However, some aspects must be kept in mind:

- the members usually have no other choice than to sell their products to the cooperative;
- several times already, and certainly the last two years, the cooperative has no money to buy the products from the farmers.

As a result of this, the members find that the price they must pay to be a member is too high in relation to the services offered.

The main crops grown are similar to those grown in upper wadi Markha; they are wheat, barley, sesame and short sorghum. It is impossible to grow the large variety of sorghum because of hot winds. Only few cash crops are grown of which sesame forms the main part. People usually cannot press the sesame seeds themselves due to lack of money and equipment. They sell the harvest in the main cities in the area (Al Bayda and/or Nisab) to people who do own sesame presses.

The Agricultural Office claims that most of the years the area is self-sufficient as far as food crops are concerned. This is in contradiction with what the farmers say. They complain that most of the time (7 years out of 10) they must buy extra wheat from the Centre Cooperative Consumption Corporation.

There are mostly shallow wells in this part of wadi Markha. Only eight boreholes exist. The water level is the same or lower as in Upper wadi Markha; during the dry season some wells run dry. A few well owners have tried to deepen their wells. But due to the sandy soil, the walls collapse at a certain depth (20 - 25m) and people do not have the money to buy concrete, cement or stones.

There are said to be three schools of eight classes each in mid and lower wadi Markha. The classes are given in shifts: twice a day, one in the morning and one in the afternoon. 3000 pupils with only a very limited number of girls are said to attend the school. Because the number of inhabitants is very low in the lower part of wadi Markha, it is expected that these schools are located only in mid wadi Bayhan. It is very interesting to note that for nomadic people there is a school system. Two schools "under the trees" are held for nomads. Unfortunately the study team was not able to obtain more information about these schools because they travel around.

In almost every village of the midstreams part of wadi Markha, there is a water scheme, paid for 50% by the government and 50% by the people themselves. Most of these villages also have public electricity. For this service the village had to pay 40% of the investment cost. This type of basic infrastructure does not exist for the people living in the lower part of the wadi due to the very scattered location of the houses. This area might be considered as the poorest of the entire wadi. There are also two health centres in this area with a limited number of male nurses.

c) **Wadi Khawrah (Markha Centre)**

Wadi Khawrah is the main side branch of wadi Markha. The number of inhabitants in wadi Khawrah is said to be 25,000. In 1975 the number of inhabitants was 17,000. Villages are located on the ancient terraces along the wadi. About one sixth of the total population is employed in off farm employment. About half of this number of people works in the Gulf States. But most of them have returned nowadays due to the crisis.

The total area under cultivation is estimated to be about 950 hectares. More than half of this surface is irrigated. On average one family (10 persons) cultivates one feddan. All the cultivated fields are located on the terraces. The main crops grown are wheat, millet, sesame and white sorghum. Furthermore in some villages also barley and vegetables (tomatoes, potatoes and onions) are grown. In one village it was mentioned that principally vegetables could be grown, but up till now this did not happen due to lack of experience. Qat is not cultivated. On several places in the area date palms are present, incidentally grown in orchards. Beside the dates use is made of the leaves for several purposes: roof construction, food for sheep and firewood.

In former days the area could be self-sufficient, but today foodcrops are bought in order to complement the needs. Sometimes a surplus is sold. Two tractors are present in the village Ja'aran (25 families). To plough one habil farmers have to pay about 180 YR rent. In some villages the surface of the ancient terraces was levelled in order to create new fields. Throughout the area a lot of old terraces are not yet cultivated. It is not clear whether this is because of a lack of money or a lack of water or a combination of these factors.

In the upstream part of the cultivated area all land is privately owned but sharecropping also exists. The percentage of sharecropping is unknown. The sharecropping system is characterised by a cooperation based on labour input between sharecropper and landowner. The sharecropper is paid in kind and receives 25% of the yields.

In the downstream part six state farms are present and land is also privately owned. The characteristics of the state farms are as follows:

- the area per state farm cultivated varies from 30-60 feddans of which on average 4-5 feddans per state farm are irrigated;
- farmers employed on a state farm are allowed to own a small piece of private land;
- on average 50 people are employed per state farm,;
- a production plan exists if there is enough water for irrigation, state farms based on rainfed agriculture do not have a production plan;
- shallow wells are privately owned in the state farms.

Each family has some livestock for domestic use. The animals are taken out in the early morning and the late afternoon. During noon they are kept inside because of the heat. Camels and donkeys have been partly replaced by cars.

In the whole wadi 360 shallow wells are present. A number of these wells are dry while other wells supply salty water only. For example in the village Ja'aran with a population of 300 people (25 families) it was told that 10 shallow wells exist. Of these 10 wells 6 are dried up, two are salty and 2 give water of a good quality but only a small quantity. After floods the dry wells are partly replenished. Water used from a privately owned well is paid in kind. The owner of the well receives 20% of the crop which was irrigated. Water for domestic use is free. Another example can be highlighted for the village Jaruf. In this area the water of shallow wells became salty and was not suitable for domestic use anymore. To provide in the need arising from this problem water was supplied by trucks.

A domestic water scheme is under construction for the whole area. Therefore it was mentioned that the construction of three boreholes was ready and was paid by the government. The distribution system however, is not yet working.

Floods occur on average several times a year. However, distinction need to be made between the upstreams and the downstreams parts of the wadi. More floods occur upstreams. When flowing downstreams the floods sometimes do not reach as far as the main village Khawrah. In most of the years the floodwater does not reach wadi Markha at all. During the last decade two floods (in 1982 and 1988) reached and passed through wadi Markha.

Due to floods several terraces are damaged. Now large scale measurements are taken to protect the fields. On several places big dams are under construction. They are constructed to replace damaged dams due to floods and to fix new lands. First the village Ja'aran directed itself to the government for assistance, but as they got no positive reaction, the people took the initiative themselves. In Ja'aran the new dam is estimated to cost about 800,000 YR. To protect the cultivated lands belonging to the villages Khawrah and Jaruf, dam construction (up to 8 meters height) started in combination with a water diversion system. Therefore the government donated 20,000 YR altogether and gave some assistance in kind (e.g. dynamite, wire for gabions). The major part of the costs is paid by the farmers themselves. The amount of money to be paid is related to the surface of land each farmer owns.

Every house in the area is connected to public electricity. Therefore most houses have a meter. It was told that the average costs are 250-400 YR per house per month. A main primary school is located in the village Khawra. In 1989 about 1700 pupils attended this school. Lessons are given in two shifts by 60 Yemeni teachers. Public transport is available for the pupils. Girls from the neighbouring villages do attend school while people in villages further away explain that the public transport capacity is not sufficient to send their girls as well. Also some small primary schools exist with a few grades only. For secondary education the people rely on Nisab town. One clinic is in course of construction while one other clinic exists. In this clinic four Yemeni nurses (men) are working.

3) Wadi Dura system (in Nisab centre)

The catchment area of wadi Dura, better known as the Nisab area, starts from the same plateau as the wadi Markha catchment area. Wadi Dura drains in north-eastern direction into the desert. Its length is about 70 km. The total catchment area is not known. Two main side branches were visited: wadi Habadan (length about 30 km) and wadi Hammam (length about 10 km). Wadi Habadan drains into north-eastern direction and wadi Dura drains into northern direction. The two wadi's join near Nisab town. Thereafter they continue as wadi Hammam. Downstreams, after Nisab town cultivated land hardly exists.

a) Wadi Dura

The study team estimated the number of people living in wadi Dura to be very high in the downstreams part (near Nisab town) and high upstreams. The agricultural census does not give any information for specific wadis because it covers the entire Nisab centre.

The surface of the cultivated land, though unknown, is large and the terraces of the wadi are wide and long in the most densely populated spots. Main food crops are millet and wheat. Nevertheless, as one goes down the wadi, these crops are progressively being replaced by cash-crops (onions, tomatoes, vegetables). The reason for this is that people get more money for selling cash crops at the private market in Nisab town. For people living upstreams in wadi Dura, the distance to the market is a constraining factor.

There is one marketing cooperative located in Nisab centre. A production plan exists, but is not in application everywhere. People do not sell any food crops to the cooperative since they hardly have enough for themselves. They do sell cash crops to be able to buy extra wheat. The services the cooperative offered to the people used to be the providing of seeds and spare parts for pumps and engines. 50% of the value is paid in cash on delivery and 50% later (without interest) after the harvest. Unfortunately as the profits of the cooperative are reducing the cash flow reduces also gradually. Therefore, there is almost no wheat for sale and prices for wheat on the private market are much higher. Moreover, the cooperative can not sell anymore pumps or engines.

With the reunification and the returning of emigrants (who left just after the revolution in the 1970's) the former landlords claim their lands back that were shared out by the government to the landless farmers.

The study team was told that there are 25 shallow wells and 3 boreholes for the entire wadi. There is enough water (especially upstreams), and after each flood the water level is replenished. The wadi bed is very wide and its banks have been carefully protected with protection walls. A Chinese project worked there in 1982.

There are two schools in wadi Dura with 20 male and 5 female teachers. 800 Pupils attend the schools out of which only 50 girls. There is one health centre in the main village Nugaq. For secondary education and hospital, people rely on Nisab town or Ataq (which is 36 km further than Nisab on the road to Lowdar). There is public electricity all the way from Nisab to the village of Haat, which is about two third of the total length of the wadi. There are four water schemes, two public and two made by the people themselves.

b) Wadi Habadan

A correct estimation of the total estimation is very difficult to give. The people claim that there are about 15,000 inhabitants in the wadi itself, which seems to be quite overestimated. The lower part of the wadi is almost not inhabited. There are about 10 villages in wadi Habadan.

The people grow mainly wheat, millet, alfalfa, potatoes, onions and fruit trees. They sell their cash crops to buy the wheat they need since they are not self sufficient in food.

There are 300 shallow wells with an average depth between 30 and 50 meters. This depth seems to be rather exaggerated. There are also three boreholes with water at a depth between 50 and 70 meters. Although many wells have water throughout the year (especially upstreams), many well owners complain about the salinity. Usually several farmers own one well near to their lands. In some villages more people must share the water. Nevertheless, after each flood the water level in the wells is said to be replenished.

It was not possible to check the number of schools in this wadi. It is estimated to be between 3 to 6. It is said that there are 4 female teachers and 1500 pupils (out of which less than 100 girls). This figure seems to be rather overestimated. Like almost everywhere in former south Yemen, there is a public transportation system for school children. There are three health centres, but only one with facilities. People rely on nearby Nisab town for health facilities and secondary education. Most of the villages have a water scheme either paid by the government or by the people. The same applies for electricity.

c) Wadi Hammam

A very brief visit was paid to wadi Hammam. This wadi is about 10 km long with only 2000 inhabitants. There are few agricultural activities in this area (wheat, sorghum and some fruit trees). The inhabitants of the wadi cannot pump more than two hours a day from their shallow wells as the town of Ataq makes use of water from wadi Hammam. The water for Ataq is pumped from four governmental boreholes in the downstreams part of the wadi. They are located on private lands that used to be owned by former landlords who left after the revolution. They pump about 3000 cubic meters per day and the water is pumped to an uphill reservoir located three km

from the boreholes. From this spot water flows by gravitation all the way down to Ataq, 35 km from there. This is the only water available for Ataq town and the extraction of groundwater here probably exceeds the annual recharge. Therefore only very little water remains for the people of wadi Hammam.

CHECKLIST IN PHASE I

I NUMBER AND DENSITY OF POPULATION

- * toponyms
- * names and number of villages
- * number of inhabitants per village/town
- * number of inhabitants per wadi

II MIGRATION RATE

- * number of men abroad per village, where? in/outside Yemen
- * estimation of percentage absent
- * remittances; trend

III AGRICULTURAL POTENTIAL

- * type of crops; percentage of crop in total; fruit trees; vegetables
- * cropping pattern; intercropping; production plan
- * existence of cooperative; land-, input-, marketing-cooperative
- * existence of an agricultural centre; extension services;
- * trend in extension of services; improved or worsened?
- * water availability
 - irrig/rainfed, spate, shallow well or borehole
 - irrigation system; type of pipes used
 - number of shallow wells and/or boreholes
 - ownership of wells - boreholes
 - accessibility to wells/boreholes; free use/rental
 - water level
 - quality of water; salinization
 - number of floods and when? duration of flood
- * quality of soil (soil conservation)
 - location of "good" and "bad" fields
 - existence of protection works
 - other problems with soils/crops/insects
- * use of fertilizer/manure, pesticides and herbicides
- * ploughing; how and when? agricultural calendar
- * area under cultivation; man/land ratio - land tenure/nr. of fields
- * marketing of output (suqs; where?) self-sufficiency rate
- * import of food/goods
- * livestock - cattle, sheep, goats, camels - grazing where?
 - marketing
- * firewood collection; gas cooking

IV BASIC SOCIAL INFRASTRUCTURE

- * domestic water supply/water scheme?
 - ownership of water scheme, accessibility and free use/rental
 - sanitation/waste water disposal/toilets

* electricity

- access to and cost of...
- ownership of generator

* education

- number of schools/buildings or open air
- paid and built by whom?
- number of pupils; boys/girls
- number of teachers, nationality, male/female
- paid and employed by...
- how many people have been outside Arabic peninsula for education?

* health centres

- where?
- distance in walking hours/driving hours

* mosques

V ROADS

- * quantity/quality
- * who built them?
- * who paid them?
- * maintenance

NEEDS: priority list: waterscheme, electricity, health centre, education, roads

ANNEX C

Tables: scoring of criteria on the basis of field visits

Area: Al Bayda, Al Bayda Nahiya, Al Bayda Province
Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	3	4	1
- irrigated agriculture	5	6	1
- rainfed agriculture	6	7	1
- rangeland and grazing capacity	1	3	2
- cash cropping	6	7	1
- land conservation	3	5	2
- agricultural cooperatives and extension centre	3	5	2
- credit, marketing cooperatives	4	6	2
- self-sufficiency (agricultural base)	5	7	2
Total			14
Population (scale 0-5)			
- number	3	3	0
- density	3	3	0
- self-sufficiency (population base)	3	4	1
- cash income from outside area	4	3	-1
Total			0
Basic social infrastructure (scale 0-5)			
- schools	3	4	1
- educational experience	3	4	1
- health centres, sanitation	2	4	2
- domestic water supply	3	4	1
- electricity	2	4	2
- small scale rural enterprises	3	4	1
- travel time to main services	3	4	1
Total			9
Women and development (scale 0-5)			
- girls school attendancy	1	4	3
- agriculture & livestock	1	4	3
- sanitation and health	1	4	3
- income off-farm activities	2	4	2
Total			11
Scoring of area			
Total score area	34		
Number of subcriteria used	24		
FINAL SCORE AREA			1.42

PS = Present situation

PF = Potential for future development

SC = Scope for development

- = not applicable

Area: As Sawadiya, As Sawadiya Nahiya, Al Bayda Province
Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	3	4	1
- irrigated agriculture	3	4	1
- rainfed agriculture	4	6	2
- rangeland and grazing capacity	2	4	2
- cash cropping	3	4	1
- land conservation	2	3	1
- agricultural cooperatives and extension centre	2	4	2
- credit, marketing cooperatives	1	3	2
- self-sufficiency (agricultural base)	5	6	1
Total			13
<u>Population (scale 0-5)</u>			
- number	3	2	-1
- density	3	2	-1
- self-sufficiency (population base)	3	3	0
- cash income from outside area	3	2	-1
Total			-3
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	2	4	2
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	1	4	3
- electricity	1	4	3
- small scale rural enterprises	2	4	2
- travel time to main services	3	4	1
Total			15
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	1	4	3
- agriculture & livestock	2	4	2
- sanitation and health	1	4	2
- income off-farm activities	1	4	3
Total			11
<u>Scoring of area</u>			
Total score area	36		
Number of subcriteria used	24		
FINAL SCORE AREA			1.50
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: As Sawmah, As Sawmah Nahiya, Al Bayda Province
 Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	4	5	1
- irrigated agriculture	6	7	1
- rainfed agriculture	5	7	2
- rangeland and grazing capacity	2	3	1
- cash cropping	6	8	2
- land conservation	3	5	2
- agricultural cooperatives and extension centre	3	5	2
- credit, marketing cooperatives	4	6	2
- self-sufficiency (agricultural base)	3	4	1
Total			14
Population (scale 0-5)			
- number	3	3	0
- density	3	4	1
- self-sufficiency (population base)	4	5	1
- cash income from outside area	4	3	-1
Total			1
Basic social infrastructure (scale 0-5)			
- schools	3	4	1
- educational experience	3	4	1
- health centres, sanitation	2	4	2
- domestic water supply	3	4	1
- electricity	3	4	1
- small scale rural enterprises	3	4	1
- travel time to main services	3	4	1
Total			8
Women and development (scale 0-5)			
- girls school attendancy	1	4	3
- agriculture & livestock	2	3	1
- sanitation and health	2	4	2
- income off-farm activities	1	4	3
Total			9
Scoring of area			
Total score area	32		
Number of subcriteria used	24		
FINAL SCORE AREA			1.33

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: At Taffah, At Taffah Nahiya, Al Bayda Province
Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	3	4	1
- irrigated agriculture	3	4	1
- rainfed agriculture	4	6	2
- rangeland and grazing capacity	2	4	2
- cash cropping	3	4	1
- land conservation	2	3	1
- agricultural cooperatives and extension centre	1	4	3
- credit, marketing cooperatives	1	2	1
- self-sufficiency (agricultural base)	5	6	1
Total			13
Population (scale 0-5)			
- number	2	2	0
- density	2	1	-1
- self-sufficiency (population base)	3	3	0
- cash income from outside area	2	1	-1
Total			-2
Basic social infrastructure (scale 0-5)			
- schools	1	3	2
- educational experience	1	2	1
- health centres, sanitation	1	4	3
- domestic water supply	1	4	3
- electricity	1	4	3
- small scale rural enterprises	2	3	1
- travel time to main services	3	4	1
Total			14
Women and development (scale 0-5)			
- girls school attendancy	1	4	3
- agriculture & livestock	2	4	2
- sanitation and health	1	4	3
- income off-farm activities	1	4	3
Total			11
Scoring of area			
Total score area	36		
Number of subcriteria used	24		
FINAL SCORE AREA			1.50

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Bana, Yaffi Muderiya, Lahej Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	1	2	1
- irrigated agriculture	6	6	0
- rainfed agriculture	3	4	1
- rangeland and grazing capacity	2	3	1
- cash cropping	2	3	1
- land conservation	0	2	2
- agricultural cooperatives and extension centre	1	4	3
- credit, marketing cooperatives	0	3	3
- self-sufficiency (agricultural base)	4	6	2
Total			14
<u>Population (scale 0-5)</u>			
- number	1	1	0
- density	1	1	0
- self-sufficiency (population base)	2	4	2
- cash income from outside area	0	0	0
Total			2
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	1	3	2
- educational experience	0	1	1
- health centres, sanitation	0	3	3
- domestic water supply	0	1	1
- electricity	0	4	3
- small scale rural enterprises	1	3	2
- travel time to main services	0	4	4
Total			16
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	0	4	4
- agriculture & livestock	1	3	2
- sanitation and health	1	4	3
- income off-farm activities	1	4	3
Total			12
<u>Scoring of area</u>			
Total score area	46		
Number of subcriteria used	24		
FINAL SCORE AREA			1.92
PS = Present situation PF = Potential for future development			
SC = Scope for development ~ = not applicable			

Area: Bayhan, Bayhan Muderiya, Shabwa Governorate
Agricultural zoning: wadi, downstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	4	6	2
- irrigated agriculture	5	7	2
- rainfed agriculture	5	8	3
- rangeland and grazing capacity	1	3	2
- cash cropping	5	7	2
- land conservation	4	6	2
- agricultural cooperatives and extension centre	7	8	1
- credit, marketing cooperatives	6	8	2
- self-sufficiency (agricultural base)	5	7	2
Total			18
<u>Population (scale 0-5)</u>			
- number	3	3	0
- density	3	3	0
- self-sufficiency (population base)	3	4	1
- cash income from outside area	1	1	0
Total			1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	5	2
- educational experience	1	4	3
- health centres, sanitation	3	5	2
- domestic water supply	2	4	2
- electricity	2	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			14
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	4	2
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			12
<u>Scoring of area</u>			
Total score area	45		
Number of subcriteria used	24		
FINAL SCORE AREA			1.88

PS = Present situation

PF = Potential for future development

SC = Scope for development

- = not applicable

Area: Bayhan, Bayhan Muderiya, Shabwa Governorate
 Agricultural zoning: wadi, midstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	6	8	2
- irrigated agriculture	6	8	2
- rainfed agriculture	5	8	3
- rangeland and grazing capacity	1	3	2
- cash cropping	6	8	2
- land conservation	7	9	2
- agricultural cooperatives and extension centre	7	8	1
- credit, marketing cooperatives	6	8	2
- self-sufficiency (agricultural base)	6	8	2
Total			18
<u>Population (scale 0-5)</u>			
- number	4	4	0
- density	4	4	0
- self-sufficiency (population base)	4	5	1
- cash income from outside area	1	1	0
Total			1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	4	5	1
- educational experience	1	4	3
- health centres, sanitation	3	5	2
- domestic water supply	3	4	1
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	3	4	1
Total			11
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	4	2
- agriculture & livestock	1	4	1
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			12
<u>Scoring of area</u>			
Total score area	42		
Number of subcriteria used	24		
FINAL SCORE AREA			1.76
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Bayhan, Mashwarah Nahiya, Al Bayda province
 Agricultural zoning: wadi, upstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	4	7	3
- irrigated agriculture	2	4	2
- rainfed agriculture	1	3	2
- rangeland and grazing capacity	1	2	1
- cash cropping	3	5	2
- land conservation	0	2	2
- agricultural cooperatives and extension centre	0	1	1
- credit, marketing cooperatives	0	2	2
- self-sufficiency (agricultural base)	2	2	0
Total			14
Population (scale 0-5)			
- number	0	0	0
- density	0	0	0
- self-sufficiency (population base)	0	0	0
- cash income from outside area	-	-	-
Total			0
Basic social infrastructure (scale 0-5)			
- schools	-	-	-
- educational experience	-	-	-
- health centres, sanitation	-	-	-
- domestic water supply	-	-	-
- electricity	-	-	-
- small scale rural enterprises	-	-	-
- travel time to main services	1	4	3
Total			3
Women and development (scale 0-5)			
- girls school attendancy	-	-	-
- agriculture & livestock	-	-	-
- sanitation and health	-	-	-
- income off-farm activities	-	-	-
Total			0
Scoring of area			
Total score area	17		
Number of sub-criteria used	13		
FINAL SCORE AREA			1.31
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Dhi Nahim, Dhi Nahim Nahiya, Al Bayda Province
 Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	4	6	2
- irrigated agriculture	5	7	2
- rainfed agriculture	5	7	2
- rangeland and grazing capacity	2	4	2
- cash cropping	6	7	1
- land conservation	4	5	1
- agricultural cooperatives and extension centre	4	6	2
- credit, marketing cooperatives	4	6	2
- self-sufficiency (agricultural base)	5	7	2
Total			16
<u>Population (scale 0-5)</u>			
- number	3	4	1
- density	3	3	0
- self-sufficiency (population base)	3	4	1
- cash income from outside area	4	3	-1
Total			1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	4	1
- educational experience	3	4	1
- health centres, sanitation	2	4	2
- domestic water supply	3	4	1
- electricity	2	4	2
- small scale rural enterprises	3	4	1
- travel time to main services	3	4	1
Total			9
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	1	4	3
- agriculture & livestock	1	4	3
- sanitation and health	1	4	3
- income off-farm activities	2	4	2
Total			11
<u>Scoring of area</u>			
Total score area	37		
Number of subcriteria used	24		
FINAL SCORE AREA			1.54
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Dhi Nakhib, Yaffi Muderiya, Lahej Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	4	6	2
- irrigated agriculture	7	8	1
- rainfed agriculture	2	4	2
- rangeland and grazing capacity	1	2	1
- cash cropping	9	9	0
- land conservation	4	6	2
- agricultural cooperatives and extension centre	3	6	3
- credit, marketing cooperatives	7	8	1
- self-sufficiency (agricultural base)	3	4	1
Total			13
<u>Population (scale 0-5)</u>			
- number	3	3	0
- density	3	3	0
- self-sufficiency (population base)	3	3	0
- cash income from outside area	3	2	-1
Total			-1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	4	4	0
- educational experience	2	4	2
- health centres, sanitation	2	5	2
- domestic water supply	0	1	1
- electricity	4	4	0
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total main criteria			9
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	4	4	0
- agriculture & livestock	2	5	3
- sanitation and health	2	5	3
- income off-farm activities	1	5	4
Total			10
<u>Scoring of area</u>			
Total score area	31		
Number of subcriteria used	24		
FINAL SCORE AREA			1.29
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Dura, Nisab Muderiya, Shabwa Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	7	8	1
- irrigated agriculture	7	8	1
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	1	3	2
- cash cropping	7	9	2
- land conservation	7	8	1
- agricultural cooperatives and extension centre	5	8	3
- credit, marketing cooperatives	8	9	1
- self-sufficiency (agricultural base)	5	7	2
Total			15
Population (scale 0-5)			
- number	3	3	0
- density	3	3	0
- self-sufficiency (population base)	3	5	2
- cash income from outside area	3	3	0
Total			2
Basic social infrastructure (scale 0-5)			
- schools	4	5	1
- educational experience	2	4	2
- health centres, sanitation	3	4	1
- domestic water supply	4	4	0
- electricity	4	4	0
- small scale rural enterprises	2	4	2
- travel time to main services	3	4	1
Total			7
Women and development (scale 0-5)			
- girls school attendancy	2	4	2
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			12
Scoring of area			
Total score area	36		
Number of subcriteria used	24		
FINAL SCORE AREA			1.50

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

 Area: Habadan, Nisab Muderiya, Shabwa Governorate
 Agricultural zoning: wadi, upstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	7	8	1
- irrigated agriculture	7	8	1
- rainfed agriculture	5	8	3
- rangeland and grazing capacity	1	3	2
- cash cropping	6	9	3
- land conservation	7	8	1
- agricultural cooperatives and extension centre	5	8	3
- credit, marketing cooperatives	8	9	1
- self-sufficiency (agricultural base)	6	8	2
Total			17
<u>Population (scale 0-5)</u>			
- number	2	3	1
- density	2	3	1
- self-sufficiency (population base)	3	5	2
- cash income from outside area	3	3	0
Total			4
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	4	5	1
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	4	4	0
- electricity	4	4	0
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			9
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	4	2
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			12
<u>Scoring of area</u>			
Total score area	42		
Number of subcriteria used	24		
FINAL SCORE AREA			1.76

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: Hamra, At Taffah Nahiya, Al Bayda Province
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential</u> (scale 0-10)			
- availability of water for agriculture and water saving	7	8	1
- irrigated agriculture	6	7	1
- rainfed agriculture	9	9	0
- rangeland and grazing capacity	2	2	0
- cash cropping	7	9	2
- land conservation	10	10	0
- agricultural cooperatives and extension centre	7	9	2
- credit, marketing cooperatives	0	6	6
- self-sufficiency (agricultural base)	6	7	1
Total			13
<u>Population</u> (scale 0-5)			
- number	5	4	-1
- density	4	3	-1
- self-sufficiency (population base)	4	3	-1
- cash income from outside area	4	2	-2
Total			-5
<u>Basic social infrastructure</u> (scale 0-5)			
- schools	2	5	3
- educational experience	1	4	3
- health centres, sanitation	1	5	4
- domestic water supply	0	2	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	1	4	3
Total			18
<u>Women and development</u> (scale 0-5)			
- girls school attendancy	1	4	3
- agriculture & livestock	2	5	3
- sanitation and health	1	4	3
- income off-farm activities	1	5	4
Total			13
<u>Scoring of area</u>			
Total score area	39		
Number of subcriteria used	24		
FINAL SCORE AREA			1.63

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Harib, Marib Nahiya, Shabwa Governorate, Marib Province
 Agricultural zoning: wadi, downstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	4	6	2
- irrigated agriculture	5	6	1
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	1	3	2
- cash cropping	5	7	2
- land conservation	4	6	2
- agricultural cooperatives and extension centre	4	6	2
- credit, marketing cooperatives	5	6	1
- self-sufficiency (agricultural base)	5	7	2
Total			16
<u>Population (scale 0-5)</u>			
- number	3	3	0
- density	3	3	0
- self-sufficiency (population base)	3	3	0
- cash income from outside area	2	1	1
Total main criteria			1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	2	4	2
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	2	4	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	3	4	1
Total			12
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	1	4	3
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			13
<u>Scoring of area</u>			
Total score area	42		
Number of subcriteria used	24		
FINAL SCORE AREA			1.76
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Harib, Bayhan Muderiya, Shabwa Governorate
 Agricultural zoning: wadi, upstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	5	8	3
- irrigated agriculture	6	8	3
- rainfed agriculture	5	8	3
- rangeland and grazing capacity	1	3	2
- cash cropping	6	8	2
- land conservation	9	9	0
- agricultural cooperatives and extension centre	5	7	2
- credit, marketing cooperatives	6	8	2
- self-sufficiency (agricultural base)	6	8	2
Total			18
<u>Population (scale 0-5)</u>			
- number	3	4	1
- density	3	4	1
- self-sufficiency (population base)	3	4	1
- cash income from outside area	1	0	-1
Total			2
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	4	1
- educational experience	1	3	2
- health centres, sanitation	2	4	2
- domestic water supply	3	4	1
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			11
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	1	4	3
- agriculture & livestock	1	4	3
- sanitation and health	1	4	3
- income off-farm activities	1	4	3
Total			12
<u>Scoring of area</u>			
Total score area	43		
Number of subcriteria used	24		
FINAL SCOPE AREA			1.88
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Hatib, Yaffi Muderiya, Lahej Governorate
Agricultural zoning: wadi, downstreams

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential</u> (scale 0-10)			
- availability of water for agriculture and water saving	4	5	1
- irrigated agriculture	5	6	1
- rainfed agriculture	5	7	2
- rangeland and grazing capacity	1	3	2
- cash cropping	2	2	0
- land conservation	3	4	1
- agricultural cooperatives and extension centre	2	3	1
- credit, marketing cooperatives	1	2	1
- self-sufficiency (agricultural base)	4	5	1
Total			10
<u>Population</u> (scale 0-5)			
- number	1	2	1
- density	1	1	0
- self-sufficiency (population base)	3	3	0
- cash income from outside area	1	0	-1
Total			0
<u>Basic social infrastructure</u> (scale 0-5)			
- schools	3	4	1
- educational experience	0	3	3
- health centres, sanitation	1	4	3
- domestic water supply	1	4	3
- electricity	1	4	3
- small scale rural enterprises	2	4	2
- travel time to main services	1	3	2
Total			17
<u>Women and development</u> (scale 0-5)			
- girls school attendancy	3	4	1
- agriculture & livestock	2	4	2
- sanitation and health	1	5	4
- income off-farm activities	2	5	3
Total			10
<u>Scoring of area</u>			
Total score area	37		
Number of subcriteria used	24		
FINAL SCORE AREA			1.54

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Hatib, Yaffi Muderiya, Lahaj Governorate
Agricultural zoning: wadi upstream

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	8	8	0
- irrigated agriculture	7	8	1
- rainfed agriculture	2	2	0
- rangeland and grazing capacity	1	2	1
- cash cropping	9	9	0
- land conservation	7	8	1
- agricultural cooperatives and extension centre	6	8	2
- credit, marketing cooperatives	5	7	2
- self-sufficiency (agricultural base)	2	3	1
Total			8
<u>Population (scale 0-5)</u>			
- number	4	3	-1
- density	3	3	0
- self-sufficiency (population base)	2	3	1
- cash income from outside area	1	0	-1
Total			-1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	5	2
- educational experience	1	4	3
- health centres, sanitation	1	5	4
- domestic water supply	4	4	0
- electricity	1	5	4
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			17
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	3	4	1
- agriculture & livestock	2	4	2
- sanitation and health	2	5	3
- income off-farm activities	2	5	3
Total			9
<u>Scoring of area</u>			
Total score area	33		
Number of subcriteria used	24		
FINAL SCORE AREA			1.38

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Khawra, Nissab Muderiya, Shabwa Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	5	7	2
- irrigated agriculture	4	6	2
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	1	3	2
- cash cropping	4	6	2
- land conservation	4	8	4
- agricultural cooperatives and extension centre	5	8	3
- credit, marketing cooperatives	5	7	2
- self-sufficiency (agricultural base)	5	7	2
Total			21
<u>Population (scale 0-5)</u>			
- number	3	2	-1
- density	3	3	0
- self-sufficiency (population base)	3	3	0
- cash income from outside area	3	2	-1
Total			-2
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	5	2
- educational experience	1	3	2
- health centres, sanitation	3	5	2
- domestic water supply	3	4	1
- electricity	5	5	0
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			11
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	5	3
- agriculture & livestock	1	5	4
- sanitation and health	1	5	4
- income off-farm activities	1	5	4
Total			15
<u>Scoring of area</u>			
Total score area	45		
Number of subcriteria used	24		
FINAL SCORE AREA			1.88

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Khirr, Bayhan Muderiya, Na'man Nahiya, Shabwa Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	6	8	2
- irrigated agriculture	5	7	2
- rainfed agriculture	5	9	4
- rangeland and grazing capacity	1	3	2
- cash cropping	4	6	2
- land conservation	7	9	2
- agricultural cooperatives and extension centre	5	8	3
- credit, marketing cooperatives	5	8	3
- self-sufficiency (agricultural base)	6	8	2
Total			22
Population (scale 0-5)			
- number	4	5	1
- density	4	4	0
- self-sufficiency (population base)	4	5	1
- cash income from outside area	2	2	0
Total			2
Basic social infrastructure (scale 0-5)			
- schools	2	5	3
- educational experience	1	4	3
- health centres, sanitation	2	5	3
- domestic water supply	2	4	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			16
Women and development (scale 0-5)			
- girls school attendancy	1	4	3
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			13
Scoring of area			
Total score area	53		
Number of subcriteria used	24		
FINAL SCORE AREA			2.21

PS = Present situation PF = Potential for future development
SC = Score for development - = not applicable

Area: Maflahi, Yaffi Muderiya, Lahaj Governorate
 Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	2	3	1
- irrigated agriculture	2	3	1
- rainfed agriculture	5	8	3
- rangeland and grazing capacity	3	6	3
- cash cropping	2	4	2
- land conservation	2	4	2
- agricultural cooperatives and extension centre	1	4	3
- credit, marketing cooperatives	2	4	2
- self-sufficiency (agricultural base)	3	5	2
Total			19
<u>Population (scale 0-5)</u>			
- number	4	3	-1
- density	4	4	0
- self-sufficiency (population base)	2	3	1
- cash income from outside area	3	2	-1
Total			-1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	4	1
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	0	3	3
- electricity	2	4	2
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			14
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	5	3
- agriculture & livestock	2	5	3
- sanitation and health	1	5	4
- income off-farm activities	1	3	2
Total			12
<u>Scoring of area</u>			
Total score area	4		
Number of subcriteria used	22		
FINAL SCORE AREA			1.83

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: Marfad, Yaffi Muderiya, Lahaj Governorate
Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	5	7	2
- irrigated agriculture	3	5	2
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	2	5	3
- cash cropping	3	5	2
- land conservation	6	8	2
- agricultural cooperatives and extension centre	4	6	2
- credit, marketing cooperatives	3	5	2
- self-sufficiency (agricultural base)	4	6	2
Total			19
<u>Population (scale 0-5)</u>			
- number	3	2	-1
- density	3	3	0
- self-sufficiency (population base)	2	3	1
- cash income from outside area	3	2	-1
Total			-1
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	2	4	2
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	2	4	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	1	4	3
Total			14
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	1	4	3
- agriculture & livestock	2	4	2
- sanitation and health	1	5	4
- income off-farm activities	2	4	2
Total			11
<u>Scoring of area</u>			
Total score area	43		
Number of subcriteria used	24		
FINAL SCORE AREA			1.79

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

Area: Markha, Nissab Muderiya, Shabwa Governorate
 Agricultural zoning: wadi downstream

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	5	7	2
- irrigated agriculture	4	7	3
- rainfed agriculture	5	7	2
- rangeland and grazing capacity	1	2	1
- cash cropping	6	9	3
- land conservation	5	6	1
- agricultural cooperatives and extension centre	3	7	4
- credit, marketing cooperatives	6	9	3
- self-sufficiency (agricultural base)	3	6	3
Total			22
Population (scale 0-5)			
- number	2	2	0
- density	2	3	1
- self-sufficiency (population base)	2	4	2
- cash income from outside area	1	2	1
Total			4
Basic social infrastructure (scale 0-5)			
- schools	3	5	2
- educational experience	1	4	3
- health centres, sanitation	2	5	3
- domestic water supply	3	4	1
- electricity	4	4	0
- small scale rural enterprises	2	4	2
- travel time to main services	3	4	1
Total			14
Women and development (scale 0-5)			
- girls school attendancy	2	4	2
- agriculture & livestock	1	3	2
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			11
Scoring of area			
Total score area			
Number of subcriteria used	24		
FINAL SCORE AREA			2.04

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: Markha, Nissab Muderiya, Shabwa Governorate/Al Bayda Province
 Agricultural zoning: wadi upstream

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	4	7	3
- irrigated agriculture	5	9	4
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	2	3	1
- cash cropping	4	7	3
- land conservation	5	7	2
- agricultural cooperatives and extension centre	3	7	4
- credit, marketing cooperatives	4	7	3
- self-sufficiency (agricultural base)	4	7	3
Total			25
<u>Population (scale 0-5)</u>			
- number	4	4	0
- density	3	5	2
- self-sufficiency (population base)	3	5	2
- cash income from outside area	4	3	-1
Total			3
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	2	5	3
- educational experience	2	4	2
- health centres, sanitation	1	5	4
- domestic water supply	2	4	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			16
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	0	4	4
- agriculture & livestock	1	3	2
- sanitation and health	1	5	4
- income off-farm activities	1	4	3
Total			13
<u>Scoring of area</u>			
Total score area	57		
Number of subcriteria used	24		
FINAL SCORE AREA			2.38

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: Mashwara, Mashwara Nahiya, Al Bayda Province
 Agricultural zoning: rangelands

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	1	1	0
- irrigated agriculture	1	1	0
- rainfed agriculture	1	2	1
- rangeland and grazing capacity	3	4	1
- cash cropping	-	-	-
- land conservation	0	1	1
- agricultural cooperatives and extension centre	0	2	2
- credit, marketing cooperatives	1	2	1
- self-sufficiency (agricultural base)	1	2	1
Total			7
Population (scale 0-5)			
- number	1	1	0
- density	1	1	0
- self-sufficiency (population base)	1	1	0
- cash income from outside area	3	2	-1
Total			-1
Basic social infrastructure (scale 0-5)			
- schools	1	2	1
- educational experience	0	1	1
- health centres, sanitation	1	3	2
- domestic water supply	0	1	1
- electricity	1	1	0
- small scale rural enterprises	1	1	0
- travel time to main services	-0	2	2
Total			7
Women and development (scale 0-5)			
- girls school attendancy	0	2	2
- agriculture & livestock	1	4	3
- sanitation and health	1	4	3
- income off-farm activities	1	2	1
Total			9
Scoring of area			
Total score area	22		
Number of subcriteria used	23		
FINAL SCORE AREA			0.96

PS = Present situation PF = Potential for future development
 SC = Scope for development - = not applicable

Area: Mukeiras, Lowdar Muderiya, Abyan Governorate
 Agricultural zoning: plateau

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential</u> (scale 0-10)			
- availability of water for agriculture and water saving	5	7	2
- irrigated agriculture	2	5	3
- rainfed agriculture	6	8	2
- rangeland and grazing capacity	1	3	2
- cash cropping	2	5	3
- land conservation	5	6	1
- agricultural cooperatives and extension centre	3	5	2
- credit, marketing cooperatives	6	7	1
- self-sufficiency (agricultural base)	4	5	1
Total			17
<u>Population</u> (scale 0-5)			
- number	3	2	-1
- density	5	4	-1
- self-sufficiency (population base)	4	3	-1
- cash income from outside area	4	2	-2
Total			-5
<u>Basic social infrastructure</u> (scale 0-5)			
- schools	3	4	1
- educational experience	2	4	2
- health centres, sanitation	2	4	2
- domestic water supply	4	4	0
- electricity	5	5	0
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			9
<u>Women and development</u> (scale 0-5)			
- girls school attendancy	3	4	1
- agriculture & livestock	2	4	2
- sanitation and health	1	5	4
- income off-farm activities	1	5	4
Total			11
<u>Scoring of area</u>			
Total score area	30		
Number of subcriteria used	24		
FINAL SCORE AREA			1.33

PS = Present situation
 SC = Scope for development

PF = Potential for future development
 - = not applicable

Area: Nati, Nati Nahiya, Al Bayda Province
 Agricultural zoning: rangelands

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential</u> (scale 0-10)			
- availability of water for agriculture and water saving	1	1	0
- irrigated agriculture	1	1	0
- rainfed agriculture	1	2	1
- rangeland and grazing capacity	3	5	2
- cash cropping	-	-	-
- land conservation	0	1	1
- agricultural cooperatives and extension centre	0	1	1
- credit, marketing cooperatives	1	3	2
- self-sufficiency (agricultural base)	1	2	1
Total			8
<u>Population</u> (scale 0-5)			
- number	1	1	0
- density	1	1	0
- self-sufficiency (population base)	1	1	0
- cash income from outside area	2	1	-1
Total			-1
<u>Basic social infrastructure</u> (scale 0-5)			
- schools	1	2	1
- educational experience	0	1	1
- health centres, sanitation	1	3	2
- domestic water supply	-	-	-
- electricity	-	-	-
- small scale rural enterprises	0	1	1
- travel time to main services	0	2	2
Total			7
<u>Women and development</u> (scale 0-5)			
- girls school attendancy	0	2	2
- agriculture & livestock	1	3	2
- sanitation and health	1	3	2
- income off-farm activities	1	2	1
Total			7
<u>Scoring of area</u>			
Total score area	21		
Number of subcriteria used	21		
FINAL SCORE AREA			1
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Thool, Yaffi Muderia, Lahej Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
Agricultural potential (scale 0-10)			
- availability of water for agriculture and water saving	2	3	1
- irrigated agriculture	2	3	1
- rainfed agriculture	6	7	1
- rangeland and grazing capacity	1	3	2
- cash cropping	2	3	1
- land conservation	1	4	3
- agricultural cooperatives and extension centre	3	5	2
- credit, marketing cooperatives	2	4	2
- self-sufficiency (agricultural base)	3	4	2
Total			15
Population (scale 0-5)			
- number	3	3	0
- density	2	2	0
- self-sufficiency (population base)	3	2	-1
- cash income from outside area	3	2	-1
Total			-2
Basic social infrastructure (scale 0-5)			
- schools	2	4	2
- educational experience	1	3	2
- health centres, sanitation	2	4	2
- domestic water supply	0	1	1
- electricity	0	4	4
- small scale rural enterprises	2	4	2
- travel time to main services	0	3	3
Total			16
Women and development (scale 0-5)			
- girls school attendancy	3	4	1
- agriculture & livestock	1	4	3
- sanitation and health	1	5	4
- income off-farm activities	2	4	2
Total			10
Scoring of area			
Total score area	39		
Number of subcriteria used	24		
FINAL SCORE AREA			1.62
PS = Present situation PF = Potential for future development			
SC = Scope for development - = not applicable			

Area: Yahar, Yaffi Muderia, Lahej Governorate
Agricultural zoning: wadi

CRITERIA AND SUBCRITERIA	PS	PF	SC
<u>Agricultural potential (scale 0-10)</u>			
- availability of water for agriculture and water saving	6	8	2
- irrigated agriculture	6	9	3
- rainfed agriculture	3	6	3
- rangeland and grazing capacity	1	3	2
- cash cropping	7	9	2
- land conservation	5	8	3
- agricultural cooperatives and extension centre	5	8	3
- credit, marketing cooperatives	6	8	2
- self-sufficiency (agricultural base)	4	6	2
Total			22
<u>Population (scale 0-5)</u>			
- number	3	4	1
- density	3	4	1
- self-sufficiency (population base)	4	4	0
- cash income from outside area	2	2	0
Total			2
<u>Basic social infrastructure (scale 0-5)</u>			
- schools	3	4	1
- educational experience	2	4	2
- health centres, sanitation	3	4	1
- domestic water supply	2	4	2
- electricity	3	4	1
- small scale rural enterprises	2	4	2
- travel time to main services	2	4	2
Total			11
<u>Women and development (scale 0-5)</u>			
- girls school attendancy	2	4	2
- agriculture & livestock	1	3	2
- sanitation and health	1	4	3
- income off-farm activities	1	4	3
Total			10
<u>Scoring of area</u>			
Total score area	45		
Number of subcriteria used	24		
FINAL SCORE AREA			1.88

PS = Present situation PF = Potential for future development
SC = Scope for development - = not applicable

ANNEX D

Questionnaires / checklists for phase two:

Women and development questionnaire
Questionnaire for the individual farm household
Agricultural questionnaire for group inquiries
Questionnaire for the returning migrants
Well questionnaire
Questionnaire/checklist suq's
Checklist for population
Questionnaire/checklist for schools and teachers
Questionnaire for clinics and nurses
Checklist for statefarms/cooperatives
Checklist for (marketing) cooperatives
Checklist for non-authorities / prominent people

WOMEN AND DEVELOPMENT QUESTIONNAIRE

1. number questionnaire
2. date interview
3. name village
4. geographical area.....
5. nahiya/muderiya.....

CHARACTERISTICS OF THE RESPONDENT

6. Composition of the household of the interviewed woman.....
.....
.....
7. Age of respondent: (1) 15-25 (2) 25-35 (3) 35-45 (4) 45-55 (5) 55 -
8. Marital Status: (1) single (2) married (3) Divorced (4) Widow
9. Number of children:.....
10. Number of boys:.....
11. Number of girls:.....
12. Main source of income: (1) arable agriculture (2) livestock
(3) off farm employment (4) remittances

WOMEN'S ROLE IN ARABLE AGRICULTURE

13. Do you work in agriculture? yes/no (if no, go to question 24)
14. In the cultivation of which crops are you involved?

(1) sorghum	(7) fruit trees
(2) qat	(8) vegetables
(3) maize	(9) wheat
(4) millet	(10) sesame
(5) barley	(11) coffee
(6) alfalfa	
15. In which activities of the agricultural process are you involved?

(1) landlevelling	(9) weeding
(2) ploughing	(10) thinning
(3) turn the earth	(11) harvesting
(4) sowing/planting	(12) dehusking
(5) fertilizing/ manure	(13) threshing
(6) water the field	(14) picking of coffee
(7) 'shariaf' of crops	(15) postharvest activities (milling of
(8) bundling of sorghum	grain, cleaning, winnowing, storing).

16. How much time do you spend on foodcrops/agricultural activities as mentioned above? (hours per day).....
17. Who assists you with these activities?.....
18. Who collects the water for agricultural purposes?
 (1) women (2) men (3) boys (4) girls (5) by pump and pipe
 (6) others (specify).....
19. How do you usually travel to the most remote field?
 (1) walking (2) by donkey (3) by car (4) other.....
20. How long does it take you to go to and return from the most remote field?hours
21. Do you sell some of your products/crops? yes/no
22. If yes, do you keep the money you received from selling the product/crop for yourself? yes/no

WOMEN'S ROLE IN LIVESTOCK

23. Do you keep animals? yes/no (if no, go to question 35)
24. What kind of stock do you keep?
 (1) goat (2) sheep (3) donkey (4) cows
 (5) chicken (6) camel (7) beehives
25. In which activities concerning livestock are you involved?
 (1) collecting fodder (4) milking
 (2) collecting water (5) milkprocessing (churning)
 (3) handfeeding (6) making dungcakes
26. How much time per day do you spend on keeping your livestock?
27. What kind of fodder do you use?
 (1) alfalfa (2) sorghum (3) maize (4) kitchen waste (5) other.....
28. Where does the water come from which you use to drink the animals?
 (1) shallow well, borehole (3) wastewater from kitchen
 (2) cistern (4) others
29. How do you mostly travel to the place where you collect fodder?
 (1) walking (2) by donkey (3) by car (4) others
30. Do you sell some of your products (milk, butter, eggs)? yes/no
31. Which products are sold?.....
32. Who sells the products?.....
33. What is more important for you? (1) arable agriculture (2) livestock

34. Why?.....

WOMEN'S ROLE IN WATER SUPPLY

35. Is there a waterscheme in the village? yes/no
36. If yes, is your house connected? yes/no
37. If not connected, from where do you get the water?.....

38. Who collects the daily water for your household?
 (1) the interviewed woman herself (2) others (specify)
39. How is the water transported to the house?
 (1) women carry the water themselves (3) by car
 (2) by donkey (4) others:.....
40. What is the time involved to make one trip to the main place where
 you collect the water? (go and return trip) hours.....
41. How many trips a day are made for water collection?
 (1) one (2) two (3) three (4) more:.....
42. What is the total daily time involved in water collection?hours
43. How do you store the water?
 (1) watertank (2) jerry can (3) iron barrel
 (4) others:.....
44. Where do you wash your clothes? (1) at home (2) at the well
45. How long does it take you to do the washing?hours
46. How often a week do you wash?time(s)
47. Total number of hours per week spent on washing clothes:.....hrs

WOMEN'S ROLE IN SANITATION

48. Do you boil the water before drinking? yes/no
49. What do you do with the waste water from the bath room?
 (1) direct from house to street
 (2) with pipe to street; length of pipe is meters
 (3) with pipe to pit
50. What is done with the waste water from the kitchen (see question 29)?
 (1) direct from house to street (4) given to animals
 (2) with pipe to street (5) given to trees and plants
 (3) with pipe to pit

51. What do you do with garbage? (combination is possible)
- (1) throw it on the street
 - (2) throw it into special garbage place
 - (3) burn it
 - (4) bury it
 - (5) leave it for the animals
 - (6) others:.....

OTHER ACTIVITIES OF WOMEN

52. Do you cook on (1) firewood (2) gas (3) dungcakes
53. Do you collect firewood? yes/no
54. What is the daily time involved in firewood collection? hours
55. Who assists you in firewood collection?.....
56. Do you have an activity with which you gain some money? yes/no
57. If yes, specify:.....
58. In what kind of activities is your husband involved? (1) emigration
(2) off farm employment (3) agriculture (4) other.....

EDUCATION

59. Did you go to school? yes/no
60. If yes, how long? years
61. If not, why not?
62. Would you like to follow a literacy course? yes/no
63. Do you have daughters who go / went to school? yes/no
64. If yes, how many daughters are going / have gone to school?.....
65. If not, why?
66. Would you like them to go to school? yes/no

MOBILITY OF WOMEN

67. Do you ever travel? yes/no
68. How many times per week/month? times per week
..... times per month one time to
68. Purpose of travel?
69. With whom?

QUESTIONNAIRE FOR THE INDIVIDUAL FARMHOUSEHOLD (A/F)

1. number questionnaire (A/F).....
2. name interviewer
3. date interview
4. name village
5. geographical area
6. nahiya/muderiya

CHARACTERISTICS OF THE RESPONDENT

7. Is the respondent head of the farm? yes/no
8. Age of the respondent?
9. Are you married? yes/no
10. If yes, in with year

POPULATION

11. Number of people in household including emigrants and boys and girls? number.....
12. Number of emigrants last year? number.....
13. Are there now members of your household abroad? yes/no, nr...
14. Does the emigrant send remittances? yes/no,YR
15. (Specially for former South Yemen) What kind of passport did you use? North/South/Other Passport
16. Do you have labour shortages on the farm as a result of migration? yes/no

AGRICULTURE

17. Estimated land resources of the respondent (in feddan/ha)?
18. Change since last years? (increased/decreased or stable):

1 / 2 / 3
19. Total land: fdd x 0.42 = ha 20. incr/decr/stable
21. Irrigated: fdd x 0.42 = ha 22. incr/decr/stable
23. Rainfed: fdd x 0.42 = ha 24. incr/decr/stable
25. Homegarden: fdd x 0.42 = ha 26. incr/decr/stable

27. - 44. Which crops do you grow?

Crop	irri-gated	rainfed	irr/rainf. combined	Surface	
				Summer	Winter
(1)alfalfa					
(2)sorghum					
(3)millet					
(4)wheat					
(5)barley					
(6)maize					
(7)qat					
(8)onions					
(9)tomatoes					
(10)potatoes					
(11)melons					
(12)coffee nr. of trees					
(13)sesame					
(14)fruit trees					
(15)other					
(16)foodcrops					
(17)cashcrops					

45. Are you selfsufficient for foodcrops in general? yes/no

46. If no, are you self sufficient during a good rainy season? yes/no

In case of cashcrops, how muc money do you gain on average from:

47. coffee YR

48. qat YR

49. cereals YR

50. vegetables/fruittrees YR

51. how and where do you sell these cashcrops ?

(1) locally sold (2) sold at the suq (3) sold to traders

52. Land tenure: (if combination, please division of area in %)

- (1) individual ownership
- (2) collective ownership
- (3) hiring short renting
- (4) hiring long renting
- (5) short term share cropping
- (6) long term share cropping
- (7) wagf

53. Who owns the land:

- (1) yourself
- (2) parents
- (3) family member
- (4) landlord

54. If wagf, what is the rent?YR per ha

55. If not owner, get a bit more information on land tenure.

.....

Farm operations:

	(1)tractor	(2)animal power	(3)men	(4)women
56.land preparation				
57.weeding				
58.harvesting				

59. Do you hire labourers to work for you on your fields? yes/no

60. If yes, on which base do they work for you?

- (1) for wagesYR/day
- (2) for barter
- nr. of days..... =YR/year

61. During which time of the year do they work for you?

.....

62. With which agricultural activities do they help you?

.....

63. Do you or members of your household work for other farmers? yes/no

64. If yes, on which base do you work for them?

- (1) for wagesYR/day
- (2) barter
- nr. of days =YR per year

65. During which time of the year?

66. What type of activities?

- 103. Wet season (mrt - aug)hrs/daydays/week
- 104. Total surface irrigated in the wet season feddan/ ha
- 105. What is the surface irrigated by the well you use?feddan
- 106. What is the minimum surface irrigated per farm? feddan

Water shortage:

- 107. Is there sometimes water shortage: yes/no
- 108. If yes, what time of the year (months 1-12):
- 109. If yes, for what duration (months):
- 110. How is the quality of the water?
(1) good (2) salt (3) not good for other reason
- 111. How often there was a water shortage in last years: times

Agricultural support/supply services

- 112. Do you receive visits from an agricultural extension agent? yes/no
- 113. Does the extension service give you inputs? yes/no
- 114. Do you make use of inputs from a cooperative? yes/no
- 115. Do you participate in farm demonstration? yes/no
- 115. Do you participate in on-farm training? yes/no
- 116. Have you ever asked for credit from a:
(1) traditional/local credit system
(2) formal/commercial credit system
(3) you never asked for credit
- 117. If you asked for credit, what did you ask credit for?

Ever received information on:

- 118. Irrigation/drainage techniques? yes/no
- 119. General cropping techniques? yes/no
- 120. Harvest and storage techniques? yes/no
- 121. Marketing? yes/no
- 122. Crop protection against diseases? yes/no
- 123. Ever received information on land conservation? yes/no
- 124. Did you ever do land conservation yourself? yes/no
- 125. If yes, through community participation? yes/no
- 126. Do you use water saving techniques? yes/no
- 127. Do you ever visit the LCCD office or the office of local authorities for development? yes/no

128. If yes, who gave the information?

- ().....
- ().....
- ().....
- ().....

OFF FARM EMPLOYMENT

129. What is the most important source of cash-income of your household?

- (1) remittances (2) saved money (3) cashcrops (4) livestock
- (5) agricultural labour (6) handicrafts (7) off-farm activities

130. What is the second most important source of cash-income of your household?

- (1) remittances (2) saved money (3) cashcrops (4) livestock
- (5) agricultural labour (6) handicrafts (7) off-farm activities

In what other activities are you involved outside your own agricultural activities, in order of importance?

131. Most important activity

132. Second important activity

133. Third important activity

- (1) day labourer (6) gas station, owner? yes/no
- (2) brick making (7) garage, owner? yes/no
- (3) building/construction (8) shopkeeping, owner? yes/no
- (4) handicrafts (9) trade
- (5) government (10) other

134. On which activity do you spend more time?

- (1) agriculture (2) off-farm activities

135. How much money do you earn per day/month/year?YR/year

136. Are other members of your household involved in one of these activities? yes/no (1)..... (2).....

GENERAL POSSESSIONS OF THE FAMILY

137. Bicycle: yes/no

138. Motorcycle: yes/no

139. Car: yes/no

140. Television: yes/no

BASIC SOCIAL INFRASTRUCTURE

141. Is your house provided with electricity?

- (1) no (2) yes, public (3) yes, private

142. If public electricity scheme exists, did you help pay for it?

- (1) no (2) yes, how much?.....YR

143. Is your house connected to a waterscheme?

- (1) no (2) yes, public (3) yes, private

144. If public waterscheme exists, did you help pay for it?

- (1) no (2) yes, how much?.....YR

QUESTIONNAIRE FOR GROUP (QAT) INQUIRIES (A/G)

1. number questionnaire (A/G).....
2. name interviewer
3. date interview
4. name village
5. geographical area
6. nahiya/muderiya

VILLAGE POPULATION

7. Number of households in village:.....
8. Estimated number of people living in village:.....
9. Estimated number of persons per family working outside Yemen:.....

AGRICULTURE

(10 - 17) Estimated land resources of the village (in feddan/ha):

Change since last years? (increased, decreased or stable):

- | | | 1 / 2 / 3 |
|---------------------------------|---------|----------------------|
| 10. Total land:.. fdd x 0.42 = | ha | 11. incr/decr/stable |
| 12. Irrigated: ... fdd x 0.42 = | ha | 13. incr/decr/stable |
| 14. Rainfed: ... fdd x 0.42 = | ha | 15. incr/decr/stable |
| 16. Homegarden:.. fdd x 0.42 = | ha | 17. incr/decr/stable |

(18 - 29) Main agricultural system in village (estimated %):

Changes in agricultural system since last years? (incr/decr/
stable)

- | | | 1 / 2 / 3 |
|--------------------------------|--|----------------------|
| 18. Irrigated food crops.....% | | 19. incr/decr/stable |
| 20. Rainfed food crops | | 21. incr/decr/stable |
| 22. Irrigated vegetables | | 23. incr/decr/stable |
| 24. Irrigated qat | | 25. incr/decr/stable |
| 26. Irrigated coffee | | 27. incr/decr/stable |
| 28. Fruit trees | | 29. incr/decr/stable |

30. Most common land tenure in the village:

(if combination, please division of area in %)

- | | |
|--------------------------|-------------------------------|
| (1) individual ownership | (5) short term share cropping |
| (2) collective ownership | (6) long term share cropping |
| (3) hiring short renting | (7) wəgf |
| (4) hiring long renting | |

LIVESTOCK

- 31. What is the average number of cows per family?
- 32. What is the average number of goats per family?
- 33. What is the average number of sheep per family?
- 34. What is the average number of camels per family?
- 35. Is the livestock permanently at home? yes/no
- 36. Is the livestock permanently in the rangelands? yes/no

WATER

Water shortage:

- 37. Well ownership: (1) private ownership (2) shared ownership
- 38. How many families make use of one well on average?
- 39. Number of wells in this village:
- 40. Change since last 10 years:
- 41. Is there sometimes a water shortage? yes/no
- 42. If yes, what time of the year (months 1-12):
- 43. If yes, for what duration (months):
- 44. If yes, for what crop (1-15):
- 45. How is the quality of the water?
 (1) good (2) salt (3) not good for other reason
- 46. How often there was a water shortage in the last 5 years: times
- 47. Is water for irrigation brought from outside this area yes/no
- 48. If yes, in which quantities?
- 49. For which price?
- 50. From where?

AGRICULTURAL SUPPORT/SUPPLY SERVICES

- 51. Does the village ever receive visits from an agricultural extension agent? yes/no
- 52. Does the extension service give inputs to the village? yes/no
- 53. Does the village use inputs from a cooperative? yes/no
- 54. Does the village participate in farm demonstration? yes/no
- 55. Does the village participate in on-farm training? yes/no
- Ever received information on:
- 56. Irrigation/drainage techniques? yes/no
- 57. General cropping techniques? yes/no

- 58. Harvest and storage techniques? yes/no
- 59. Marketing via cooperative/self? yes/no
- 60. Crop protection against insects/diseases? yes/no
- 61. Ever received information on land conservation? yes/no
- 62. Did you ever do land conservation yourself? yes/no
- 63. If yes, through community participation? yes/no
- 64. Do/did you use water saving techniques? yes/no
- 65. If yes, get some more information:

- ()
- ()
- ()
- ()
- ()

- 66. What are the activities of the local authorities for development in this village?
- 67. What are constraints in their activities?
- 68. What are possibilities for development in future?

MARKETING

- 69. To which market/sug do most of the villagers go?

INFRASTRUCTURE

- 70. Is there a water scheme in the village?
(1) no (2) yes public (3) yes private
- 71. If a public water scheme exists, did the village have to for the construction?
(1) no (2) yes, how much? YR per family

ELECTRICITY

- 72. Is there electricity in this village?
(1) no (2) yes, public (3) yes, private
- 73. If public electricity exists, how much is paid per month/per family?
.....YR per family

28. (No question), calculate earnings per yearYR/..... S.Rial
29. Did you lose money when you were forced to return?YR

REMITTANCES

30. Did you send money to the family in the village? yes/noYR
31. How did you send money home?
 (1) through the bank (2) through agents
 (3) through friends/relatives (4) yourself
32. Did your wife and children join you as migrants? yes/no
33. Did you ever think about taking them with you? yes/no
34. Was this possible in the city where you worked? yes/no
35. If they did not join, why not?

FIELDS

36. Do you have fields in the area? yes/no
37. If yes, do you own them? yes/no
38. If not, do you (1)rent them or (2)sharecropping?
39. Do you have enough fields to make a living? yes/no

CARE TAKING AT HOME

40. When you are abroad, who takes care of the house?
 (1) your wife, (2) eldest son, (3) your brother, (4) other
41. When you are abroad, who takes care of the fields?
 (1) your wife, (2) eldest son, (3) your brother, (4) other
42. When you are abroad, (1) do they cultivate the fields, or
 (2) do they just rely on your remittances, (3) other possibilities?

RETURNING ABROAD IN FUTURE

43. Will you go (after the Gulf crisis) abroad again? yes/no
44. To the place were you used to work? yes/no
45. To do the same job? yes/no
46. For what wage? (1)higher, (2) lower, (3) same

AFTER RETURN IN YEMEN

47. Can you find a job with the skills you have learned outside Yemen?
 yes/no
48. Can you find a job in agriculture in your area? yes/no

- 49. Will you come back to your village? yes/no
- 50. If not, where will you settle?
- 51. Will your family join you to the new place? yes/no
- 52. If yes, (1)temporarily, or (2) permanent?

IN FORMER SOUTH YEMEN IN PARTICULAR (QSYM)

- 53. Was emigration allowed? yes/no
- 54. Since when was it allowed?
- 55. If not, were there possibilities to leave South
 Yemen? yes/no
- 56. If yes, was it allowed to come back for holidays to your
 village? yes/no
- 57. If emigration was not allowed, how did you manage
 to leave?
- 58. And how did you manage to come back?
- 59. How could you send or bring money to your family?

QUESTIONS FOR THE WIFE LEFT BEHIND (QMW)

- 60. Did your husband ever work abroad? yes/no
- 61. Did your husband ever work in another place in Yemen? yes/no
- 62. Who took care of the house?
 - 1) the woman interviewed
 - 2) eldest son
 - 3) your husband's brother
 - 4) others:
- 63. Who took care of the fields?
 - 1) the woman interviewed
 - 2) eldest son
 - 3) your husband's brother
 - 4) others:
- 64. Do you have more work when your husband is out? yes/no
(if not go to question 59)
- 65. If yes, what kind of work?
- 66. Are you assisted in this extra work? yes/no
(if not go to question 59)
- 67. If yes by whom?
- 68. Do you have to pay them ? (1) no (2) in cash (3) in kind
- 69. Do you/did you receive money from your husband? yes/ no
- 70. If not, how do you manage to make a living?
- 71. Would you like to join your husband outside the village? yes/no
- 72. If yes, is this possible? yes/no
- 73. If not, why not?.....

WELL QUESTIONNAIRE

- | |
|-------------------------------|
| 1. number questionnaire |
| 2. name interviewer |
| 3. date interview |
| 4. name village |
| 5. geographical area |
| 6. nahiya/muderiya |

7. Co-ordinates '.....' '.....'
8. Co-ordinates x.....km y.....km
9. Elevationm
10. What is the source?
 (1) borehole (2) well (3) spring

CAPACITY WELL/BOREHOLE

11. Does it contain water at the moment yes/no
12. If no, does it have water part of the year yes/no
 (go to question 16)
13. What is the static water level (level when not pumped)?.....m
14. What is the dynamic water level (level measured?m
15. What is the depth of the well to the bottom?m
16. How is the water level on the long term (e.g. since last 5 years)?
 (1) rising
 (2) lowering
 (3) stable
17. If the table is stable, how often is the water level replenished?
 once per (1) 1 year (2) 2 years
 (3) 3 years (4) 4 years
 (5) 5 years
18. How is the water brought up out of the well?
 (1) by hand (2) by pump (3) by animal
19. What is the capacity of the pump? kilowatt
20. Is water from this well also collected by truck? yes/no
21. If yes, how often per year? times
22. And in which months? 1 2 3 4 5 6
 7 8 9 10 11 12
23. What is the capacity per truck? liters
24. Is it used for domestic or for irrigation purposes?
 (1) domestic (2) irrigation

25. What is the price paid for 1 truck of water? YR
26. What is the yield capacity of water pumped out of the well? 1/s
- Quantity of water pumped
27. Dry season (sept - feb)hrs/daydays/week
28. Total surface irrigated in the dry seasonfeddan/ha
29. Wet season (mrt - aug)hrs/daydays/week
30. Total surface irrigated in the wet season feddan/ ha
31. Do you consider your existing water supply satisfactory? yes/no
32. Do you sometimes have a shortage of water? yes/no
33. If yes, what time of the year?
- | | | | | | | |
|--------|---|---|---|----|----|----|
| Months | 1 | 2 | 3 | 4 | 5 | 6 |
| | 7 | 8 | 9 | 10 | 11 | 12 |
34. If yes, for what duration is a water shortage? months
35. Is the well covered? yes/no
36. How often is well cleaned?times per

WATER USE

37. For what purposes(s) is the water used?

- (1) Domestic water
- (2) Irrigation water
- (3) Both

By how many households?

38. For domestic use households
39. For Irrigation use households

Is the water quality satisfactory/good for:

40. drinking yes/no
41. cooking yes/no
42. washing yes/no
43. animals yes/no
44. irrigation yes/no

45. How is the quality in general over the last years?

- (1) decreasing
- (2) increasing
- (3) stable

46. Are there salinity problems? yes/no
47. Is there a storage reservoir present? yes/no
48. Is there a water distribution system present? yes/no

Do people have to pay for

- 49. Domestic water yes/no
- 50. If yes, how much
- 51. Irrigation water yes/no
- 52. If yes, how much?
- 53. EC measuring S
- 54. Water samples (2) (number)

FLOODS

- 55. How many times a year do floods occur on average? times
- 56. Is flood water used for irrigation? yes/no

QUESTIONNAIRE/CHECKLIST SUQ'S

- | |
|-------------------------------|
| 1. number questionnaire |
| 2. name interviewer |
| 3. date interview |
| 4. name village |
| 5. geographical area |
| 6. nahiya/muderiya |

7. Characteristics of the suq
- on what day(s) is this suq?
 - what is the most important day?
 - number of traders:male/female
 - size/importance of the suq
 - type: qat / livestock / fuelwood / local agricultural goods /
other local goods / imported goods

CHARACTERISTICS OF THE RESPONDENT

8. Sex of the respondent? male / female
9. Purpose of the visit? buying / selling
10. What is your home village?
11. How far is it walking/driving from the village to the suq? hrs
12. Geographical area / wadi?
13. How often do you go to this suq?/ week
...../ month
14. What is the reason that you go to this suq especially?

FOR THE RESPONDENT WHO COMES TO BUY AT THIS SUQ

15. What kind of products do you buy at this suq?
qat / livestock / fuel wood / local agricultural goods /
other local goods / imported goods
16. Do you go to this suq for buying products / goods only? yes / no
17. For what other reasons do you visit this suq/village also?
18. Are there other suq's where you buy goods?

FOR THE RESPONDENT WHO COMES TO SELL AT THIS SUQ

19. What is your most important source of income?
1 cash crops 2 livestock 3 remittances
4 trading business 5 paid job
20. What is your second most important source of income?

21. The products you sell are they produced by yourself?
(1) yes, farmer who sells his surplus (2) yes, farmer/trader
(3) trader only
22. If not own production, where do these products come from?
.....
23. Is selling of these products the most important source of cash income?
yes / no
24. Do you have a free place, shed?
25. Do you pay for this place/shed? yes/no YR
26. To whom do you have to pay?
27. Are there other suq's where you sell goods?
28. If yes, to which suq?
29. If yes, on what day?
30. How often do you go to these other suqs?/week
...../month
31. What kind of products do you sell at this suq?
qat / livestock / fuelwood / local agricultural goods /
other local goods / imported goods
32. In case of fuelwood, what is the price?YR
33. Number of buyers daily on average:.....
34. Amount of money you make at this suq daily:.....YR
(if possible, ask for profit made)YR profit
35. Do you go to this suq for selling products / goods only? yes / no
36. For what other reasons do you visit this suq/village also?
37. The products you sell are they produced by yourself?
(1) yes, farmer who sells his surplus (2) yes, farmer/trader
(3) trader only
38. Where do these products come from?
39. Is selling of these products the most important source of cash income?
yes / no

CHECKLIST FOR POPULATION

(Please, use answer table!)

1. What is the geographical area?
2. What is the muderiya?
3. What is the name of the village?
4. How many people are living in this village?
5. How many families live in this village?
6. What is the average number of people per family?
7. What is the number of villages in the area?

(define area)

.....
.....

8 . Answer table

Name of village school/clinic	Nr of families per village	Nr of people per village	Total nr of people in vill.

QUESTIONNAIRE / CHECKLIST FOR SCHOOLS AND TEACHERS

- | |
|-------------------------------|
| 1. number questionnaire |
| 2. name interviewer |
| 3. date interview |
| 4. name village |
| 5. geographical area |
| 6. nahiya/muderiya |

7. Number of households in village:.....
8. Number of people living in village:.....
9. What is the level of the school? (1) primary (2)secondary

PRESENT SITUATION

10. How many grades has the school?
11. What is the number of pupils attending the school?
12. How many boys?
13. How many girls?
14. What is the number of teachers?
15. How many male teachers?
16. How many female teachers?
17. Are the male teachers from Yemen or abroad?
- (1) Yemen (2) Sudan (3) Egypt (4) other
18. Are the female teachers from Yemen or abroad?
- (1) Yemen (2) Sudan (3) Egypt (4) other
19. Are the classes seperate or mixed? (1) seperate (2) mixed
20. Where do the pupils have to go for other education (highschool)?

SITUATION SOME (5) YEARS AGO

21. How many grades had the school?
22. What was the number of pupils attending the school?
23. How many boys?
24. How many girls?
25. What was the number of teachers?
26. How many male teachers?
27. How many female teachers?
28. Were the classes seperate or mixed? (1) seperate (2) mixed

OTHER INFORMATION

29. What is the service area of the school/

From which villages do the pupils come

- | | | |
|-----|-----|------|
| (1) | (5) | (9) |
| (2) | (6) | (10) |
| (3) | (7) | (11) |
| (4) | (8) | (12) |

30. Is there public transport for school children? yes/no

31. What is the longest travel time for children to reach school?min

32. Does the school provide special courses for men/women? yes/no

33. If yes, on which base: (1) private initiative

(2) village initiative

(3) government initiative

34. Is the school building used for other purposes then education? yes/no
if yes, specify

35. What is the present teacher/pupil ratio?

36. What is the teacher/"total number of inhabitants of service area"
ratio?

QUESTIONNAIRE / CHECKLIST FOR CLINICS AND NURSES

- | |
|-------------------------------|
| 1. number questionnaire |
| 2. name interviewer |
| 3. date interview |
| 4. name village |
| 5. geographical area |
| 6. nahiya/muderiya |

7. Number of households in the village?

8. Number of people in the village?

9. When did the clinic start functioning? 19..

How many people are working in the clinic?

(10) nr. of men (11) nr. of women

11. What are the functions of the men?

(1) doctor (2) nurse (3) other

12. What are the functions of the women?

(1) doctor (2) nurse (3) other

13. What are the services given?

(1) vaccinations (4) midwives
(2) family planning (5) trad. birth attendance
(3) mother and child health (6) first aid
(7) others

14. What is the service area of the clinic? /

From which villages do the patients come?

(1) (7)
(2) (8)
(3) (9)
(4) (10)
(5) (11)
(6) (12)

15. How many people (adults & children) live in this service area?.....

16. How many people come to the clinic every month...../year.....

17. How many men?

18. How many women?

19. How many boys?

20. How many girls?

21. Which category/ies increased in the last (5) years?

(16) (17) (18) (19)

22. And which category/ies decreased in the last (5) years?

(16) (17) (18) (19)

23. What are other possibilities for women?

24. What are the longest travel times to reach the clinic? min

25. What are the average costs to reach the clinic? YR

26. What are the highest costs to reach the clinic? YR

27. Is there a local training centre in the area? yes/no

CHECKLIST FOR STATEFARMS/COOPERATIVES**LAND**

- How many feddan..... x 0,42 = ha?
- Was (all) the land private before the revolution?
- Is there private land within the statefarm?
- Do farmers join the statefarm with their private land?
(MAP of landuse)

WATER

- How many shallow wells/boreholes?
- " " " " " were dug by the government?
- Who owns them?
- How many of them have pumps and/or engines?
- Are these pumps/engines privately or collectively owned?

LABOUR

- How many labourers work in the statefarm?
- What is their income?
- What services are offered to them?
- Do they have private land within the statefarm or outside the statefarm?
- Do they own shallow wells and/or boreholes?

CAPITAL

- How many tractors? pumps? engines?
- Livestock? Which and how many?
- Fertilizer? seeds?

OUTPUT

- Is there an production plan?
- Who makes it?
- What are the main objectives?
- What is done with the output from the state farm?

ORGANIZATION STRUCTURE

- Is there a head/director of the statefarm?
- Who is responsible?
- Contacts with levels below and above the respondent and contacts with the farmers (organogramme)
- What does the statefarm/cooperative think about the possibilities for future development?
- What has to be changed according to respondent?
- What are the main constraints?

CHECKLIST FOR (MARKETING) COOPERATIVES

- What kind of cooperative is this?
- What kind of services are provided?
- What are the objectives of the cooperative?
- How many farmers are member of the (marketing) cooperative?
- Do the members pay a price for membership?
- Which crops does the marketing cooperative buy from the farmers?
- How much is paid for each crop to the farmers?
- How and by whom are these prices decided on?
- Where does the output go to?
- What other services does the marketing cooperative give to its members?
- Organization structure?
- Does the government have a plan for the marketing cooperative?
- What kind of contact does the cooperative/government have with the farmers?
- How is contact kept with the farmers?
- What are the main constraints for development?
- What must change according to the respondent?
- What does the cooperative think about the possibilities for future development?

CHECKLIST FOR NON-AUTHORITIES / PROMINENT PEOPLE

Self sufficiency of people

- On what do the people rely to make a living?
 - * cash cropping
 - * food crops
 - * remittances
 - * wage from labour in Yemeni cities
 - * off farm employment in the area
 - * livestock
 - * How many emigrants before Gulf Crisis? Did they all return?
If not, do you know why? On what scale?

INSTITUTIONAL ENVIRONMENT

In the village

Political and LCCD

- What are the political, or LCCD authorities who come to this village?
(LCCD, Director of nahiya, muderiya)
- What for?
- How many times a year, a month?
- What do they do for this village? Which authority?
- Do they defend the village interest to the nahiya, to the Provincial Council, to the Governor?
- Their interventions led to what results in the past?
- Who has chosen the LCCD representatives?

Economical situation

- Is there an agricultural cooperative or an extension centre that comes to the village? What for? Do they help? In what way? Advices? Supervision? Inputs? What kind?
Is there help enough? What is missing?
What do people have to pay for the services? Are the services offered increasing or decreasing?
If there is none, what do you think such an organisation could do for the village?
- Is there a marketing cooperative? If yes; do the villagers sell something to this cooperative?

What do they sell? What proportion of their production? Why to them and not to a private market? Who fixes the prices? Is the price high enough?

Is there a private man who buys all the production in the village?

What does he buy? Why do people sell to him?

Can they go and sell somewhere else?

If yes, do they do it?

Is the price they get higher than the price they get from the cooperatives or the private man?

Are the services which are offered by the cooperatives or the private people increasing or decreasing?

Do people have to pay something to be a member of the cooperative?

If yes, how much?

Skills

- Is there a way to receive training/ professional skills in the village? How?
- How much does it cost? Do people attend to this service? How many?
- What kind of training is given? Who organised it?
- What do people, who attend the training, think of it?
- If there is no training course, would the villagers like to follow a training course, if yes what kind of training course?

ANNEX E

Work programme of the study team

Time schedule first phase of inventory study (1/10/1990-30/11/1990)

October / November

Sunday	30:	Arrival in Rada, students / mr.Prowizur	
Monday	1:	Rada, introduction	
Tuesday	2:	" "	
Wednesday	3:	" "	
Thursday	4:	" "	
Friday	5:	students - Sana'a / Prowizur - Rada	
Saturday	6:	" "	
Sunday	7:	" "	
Monday	8:	Wadi Hamra (At Taffah)	
Tuesday	9:	" "	
Wednesday	10:	Rada, reporting	
Thursday	11:	Wadi Ghayl (Mashwara)	
Friday	12:	" "	
Saturday	13:	" "	(arrival Pauline Brombacher)
Sunday	14:	Rada, reporting	
Monday	15:	" "	
Tuesday	16:	Wadi Bayhan (Mashwara) + Wadi Harib (Nati)	
Wednesday	17:	" "	
Thursday	18:	" "	
Friday	19:	" "	
Saturday	20:	" "	
Sunday	21:	Rada, reporting	
Monday	22:	" "	
Tuesday	23:	" "	
Wednesday	24:	" "	
Thursday	25:	Mukayras area (Lawdar Muderiya)	
Friday	26:	Wadi Hatib + Wadi Shaffan (Yaffi Muderiya)	
Saturday	27:	" "	
Sunday	28:	Aden	(arrival ms.Scheepers)
Monday	29:	" "	
Tuesday	30:	" "	
Wednesday	31:	Rada, reporting	
Thursday	1:	Wadi Yahar + Wadi Bana + Hajar Al Labus (Yaffi Muderiya)	
Friday	2:	" "	(arrival mr.Van Staveren)
Saturday	3:	" "	
Sunday	4:	" "	(arrival mr.toerner)
Monday	5:	" "	
Tuesday	6:	Rada, reporting	
Wednesday	7:	" "	
Thursday	8:	" "	

Friday	9:	Wadi Markha	
Saturday	10:	"	
Sunday	11:	"	
Monday	12:	"	
Tuesday	13:	"	
Wednesday	14:	Rada, reporting	
Thursday	15:	van Staveren & Prowizur - Sana'a Boehmer - Yaffi Scheepers, Brombacher, Scholten & Kolhoff - Rada, reporting	
Friday	16:	"	(arrival mr. Van Schagen)
Saturday	17:	- choice of priority areas	
Sunday	18:	- timeschedule & objectives and methodology	
Monday	19:	- questionnaires, reporting	
Tuesday	20:	"	"
Wednesday	21:	"	"(dep. mr. Van Staveren & mr. Prowizur)
Thursday	22:	"	"
Friday	23:	"	"
Saturday	24:	"	"
Sunday	25:	"	"
Monday	26:	Rada	
Tuesday	27:	"	
Wednesday	28:	"	
Thursday	29:	"	
Friday	30:	"	

Tentative time schedule for second phase

December

Saturday	1:	Start phase II, library Aden, GIS Rada (dep. ms. Scheepers)	
Sunday	2:	"	"
Monday	3:	"	"
Tuesday	4:	"	"
Wednesday	5:	"	"
Thursday	6:	"	"
Friday	7:	Rada	
Saturday	8:	Yaffi (I)	
Sunday	9:	"	
Monday	10:	"	
Tuesday	11:	"	
Wednesday	12:	"	
Thursday	13:	Rada, reporting	
Friday	14:	"	"
Saturday	15:	"	"
Sunday	16:	"	"
Monday	17:	"	"
Tuesday	18:	Yaffi (II)	
Wednesday	19:	"	
Thursday	20:	"	
Friday	21:	"	
Saturday	22:	"	
Sunday	23:	Rada, reporting	
Monday	24:	"	"

Tuesday 25: Rada
 Wednesday 26: "
 Thursday 27: "
 Friday 28: "
 Saturday 29: "
 Sunday 30: "
 Monday 31: "

January

Tuesday 1: "
 Wednesday 2: Rada, reporting
 Thursday 3: " "
 Friday 4: " "
 Saturday 5: Khirr

(arr. Prowizur)

Sunday 6: "
 Monday 7: "
 Tuesday 8: "
 Wednesday 9: "
 Thursday 10: "
 Friday 11: Rada, reporting
 Saturday 12: " "
 Sunday 13: " "
 Monday 14: " "
 Tuesday 15: " "
 Wednesday 16: Markha (I)
 Thursday 17: "
 Friday 18: "
 Saturday 19: "
 Sunday 20: "
 Monday 21: Rada, reporting
 Tuesday 22: " "
 Wednesday 23: " "
 Thursday 24: " "
 Friday 25: " "
 Saturday 26: Rada
 Sunday 27: "
 Monday 28: "
 Tuesday 29: "
 Wednesday 30: "
 Thursday 31: "

(dep. Prowizur)

February

Friday 1: Markha (II)
 Saturday 2: "
 Sunday 3: "
 Monday 4: "
 Tuesday 5: "
 Wednesday 6: Rada, reporting
 Thursday 7: " "
 Friday 8: " "
 Saturday 9: " "
 Sunday 10: " "
 Monday 11: Markha (III)

(arr. van Staveren)

Tuesday	12:	"		
Wednesday	13:	"		
Thursday	14:	"		
Friday	15:	"		
Saturday	16:	Rada, reporting		(arr. Scheepers & Prowizur)
Sunday	17:	"	"	
Monday	18:	"	"	
Tuesday	19:	"	"	
Wednesday	20:	"	"	
Thursday	21:	Rada, data processing		
Friday	22:	"	"	
Saturday	23:	"	"	/ workshop
Sunday	24:	"	"	"
Monday	25:	"	"	"
Tuesday	26:	"	"	"
Wednesday	27:	"	"	"
Thursday	28:	"	"	"

March

Friday	1:	Draft main report		
Saturday	2:	"		
Sunday	3:	"		
Monday	4:	"		
Tuesday	5:	"		
Saturday	6:	"		
Sunday	7:	"		
Monday	8:	"		
Tuesday	9:	"		
Wednesday	10:	"		
Thursday	11:	"		
Friday	12:	"		
Saturday	13:	Departure van Staveren, Scholten, Brombacher & Kolhoff		
Sunday	14:			
Monday	15:	Final reporting		
Tuesday	16:	"		
Wednesday	17:	"		
Thursday	18:	"		

ANNEX F

Persons contacted

LIST OF NAMES OF PEOPLE CONSULTED BY THE STUDY TEAM

- Ali Ahmed Al Harazi (Al Bayda); Governor of Al Bayda Province;
- Hassan al Babli (Al Bayda); Director of the Agricultural Office in Al Bayda Province plus deputy manager of RIRDP;
- Mogbil Ahmed Mogbil (Aden); Deputy Minister for Plants and Animal Production; Ministry of Agriculture and Water Resources;
- Doctor Abd El Aziz Seif (Aden); Deputy Director of the Department of Irrigation; Ministry of Agriculture and Water Resources;
- Khalid Abdul Wahed (Aden); Deputy Minister of Central Planning and Statistics;
- Saaleh Abdullah (Hajar Al Labus); Director of Yaffi Muderiya;
- Mohammed Abu Bakr (Al Djurba); Secretary of Mahmum in Maflahi Centre, Yaffi Muderiya;
- Rassas Ben Alaoui (Mashwara Nahiya); Director of Mashwara Nahiya
- Salah Abdallah Al Gababi (Hal Hal); Director of Markha Nahiya;
- Abdul Aziz Mohammed Abdullah (Nisab); Director of Agriculture for Nisab Muderiya;
- Ali Nasser Edna (Bayhan); Director of Agriculture of Bayhan Muderiya;
- Abdurab Salleh Ali (Hajar Al Labus); Director of Agriculture for Yaffi Muderiya;
- Abd Gaoui Hassein (Al Djurba); Representative of Education of Maflahi Centre in Yaffi Muderiya;
- Mohammed Faycal (Nuqub); Deputy Project Manager of "Wadi Bayhan Agricultural Development Project";
- Abdullah Al Gaish (Nuqub); Water Specialist of "Wadi Bayhan Agricultural Development Project";
- Amin Abdullah (Nisab); Deputy Director of Nissab Extension Centre;
- Mahmud Mowqah (Ataq); Director of the Irrigation Department of the Agricultural Office;
- Ahmed Saif (Ataq); Deputy Agricultural Director;
- Deputy of LCCD of Na'man Nahiya (Sa'ah);
- Secretary of LCCD of As Sawmah Nahiya (Al Bayda);
- Abdurabu Reghabi (Al Bayda); President of LCCD of Nati Nahiya;
- Hussein Sallah El Baji (Nugaq); President of LCCD of Markha Nahiya;
- Alaoui Mohammed Jebel (Jendl); President of LCCD of At Taffah Nahiya;
- Abd El Karm Hussan (Mashwara); President of LCCD of Mashwara Nahiya;
- Mr. van Schagen (The Hague, Rada) Area Manager, Euroconsult;
- Mr. Brandt (The Hague) Desk Officer Yemen DGIS;
- Mr. Ramsouk (Sana'a, The Hague) Desk Officer Yemen DGIS;
- Mr. Bartelink (Sana'a, The Hague, Rada) Sector Specialist Rural Development, Netherlands Embassy Sana'a;
- Mrs. Zimmermann (Sana'a, Rada) Sector Specialist Women and Development, Netherlands Embassy, Sana'a;
- Mr. Jongstra (Sana'a) Associate Demographer of the Central Statistical Organization;

- Ms. Zwart; Health Women and Small Scale Research, SRWSD Project, Dhamar
- Ms. Boon; Public Health Nurse, PHC Clinic, Rada

RIRD P STAFF RADA

- Ahmed Mohammed Abu Rijal, General Manager;
- Hassan al Babli, Deputy Manager for Al Bayda;
- Mr. Smits, Teamleader Technical Assistance Unit (TAU);

Head of Sections

- | | |
|------------------------------|--|
| - Abdalah Awlag | Roads, Land and Water Conservation |
| - Ali Al Aiashi | Agricultural Extension |
| - Ahmed Shami | Planning, Monitoring and Evaluation |
| - Mohmed Mahyoub | Al Khabar Farm |
| - Yahiya Al Wasabi | Livestock |
| - Mohmed Sharaf | Deputy General Manager for Agriculture |
| - Abd Al Kareem Al Tam | Deputy Agricultural Extension |
| - Hussein Idris | Finance and Administration |
| - Nadia Ali Allawi ad Draibi | Rural Women Extension |
| - Salah al Jafni | Engineering |

Rural Women Extension Section

- | | |
|--------------------------|------------------------------|
| - Faiza Abdalla Mohammed | Agricultural Adviser TAU |
| - Ans Janssen | Handicraft Adviser TAU |
| - Liesbeth Zonneveld | Health Education Adviser TAU |
| - Awatif Abdalla Mohamed | Livestock Adviser TAU |

Specialized Extension Agents:

- | | |
|------------------------------------|--------------------|
| - Hakma Abdallah Hassan al Qasab | - agriculture |
| - Miriam Mohammed Rabish | - handicrafts |
| - Amina Mohammed Allawi al Aodi | - health education |
| - Butheina Abdallah Hassan Alqasah | - livestock |

ANNEX G

Colour copy of satellite photo of the study area (1:500,000)



STUDY AREA
AL BAYDA PROVINCE
WITH ADJACENT BAYHAN
NISAB AND YAFFI
MUDERIYA

SCALE 1:500,000