Islamic Republic of Afghanistan

Ministry of Rural Rehabilitation and Development

(MRRD)

RuWatSIP Department

Final Inception Report for

Capacity Building and Institutional Cooperation in the field of Hydrogeology for Faryab Province Afghanistan

Financed by the Norwegian Agency for Development Cooperation (NORAD)

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NORPLAN

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REVISION:

The inception report has been revised after the Annual Meeting between NORAD and MRRD and include additions as agreed to be included in the revised inception report.

The revision or additions in this late revision include:

- New GIS Adviser needed and recruited-
- Training logistics officer needed
- Now photos with new personnel
- New project organization diagram with GIS-MIS
- MRRD and RuWatSIPs contribution to the project. (Budgets in separate revised budget)
- Project risks to be
- Gender issues

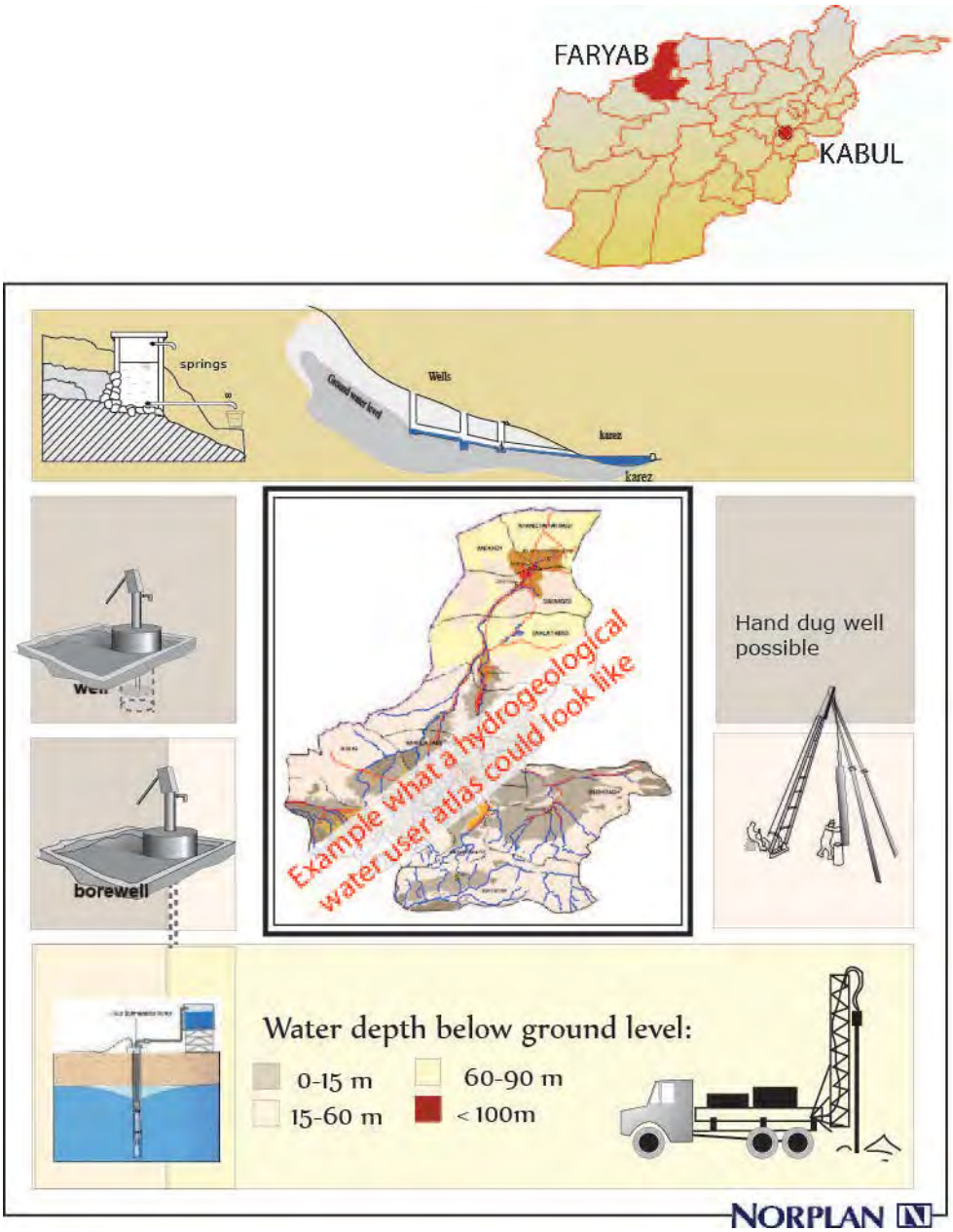


Figure give a possible approach how to a hydrogeological / water use atlas can be structured.

CONTENTS

ACRONYMS AND ABBREVIATIONS

AFG	Afghanistan
ARTF	Afghanistan Reconstruction Trust Fund
AUWSSC	Afghan Urban Water Supply & Sewerage Corporation
CAD	Computer Aided Design
CAWSS	Central Agency for Water Supply and Sewerage
CDC	Community Development Committee
CLTC	Community Led Total Sanitation
DACAAR	Danish Committee for Aid to Afghan Refugees
DDA	District Development Assemblies
DPSI	Direct Project Implementation Section
e.g.	For example
GIS	Geographical Information System
GIZ	German International Development Cooperation
GPS	Global Positioning System
ha	Hectare
HGS	Hydrogeological Study
ICCB	Institutional Cooperation and Capacity Building
IP	Induced Polarisation
ISAF	International Security Assistance Force
Km2	Square kilometres
MAIL	Ministry of Agriculture Irrigation and Livestock
MFA	Ministry of Foreign Affairs - Norway
MIS	Management Information System
MoMI	Ministry of Mine and Industry
MoWE	Ministry of Water and Energy
MoPH	Ministry of Public Health
MRRD	Ministry of Rural Rehabilitation and Development
MUDH	Ministry of Urban Development and Housing
NABDP	National Areas Based Development Program
NCA	Norwegian Church Aid
NGO	Non Governmental Organisation
NOK	Norwegian Kroner
Norad	Norwegian Agency for Development Cooperation
NRAP	National Rural Access Program
NSP	National Solidarity Program
O&M	Operation and Maintenance
PCU	Project Coordination Unit
PRRD	Provincial Rural Rehabilitation and Development
PRT	Provincial Reconstruction Team
RFP	Request for Proposal
RuWatSip	Rural Water Supply, Sanitation and Irrigation Department in the MRRD
TMU	Technical Monitoring Unit
TNA	Training Needs Assessment
TOR	Terms of Reference
UN	United Nations
UNICEF	United Nations International Children Emergency Fund
U.S.	United States
WASH	Water and Sanitation and Health
WSG	Water and Sanitation Sectoral Group
WSIP	Urban Water Supply Improvement Program
%	Percentage

1 PROJECT SYNOPSIS

The inception report gives and presents the overview of status and how the consultant understands the project and how it can be implemented.

After a slow start, the project office in Kabul has been established and basic furniture is in place. Funds are now available for procurement of equipment and transport.

As the report presents, a large international team visited Kabul and held good discussions with the client, MRRD, its project partner DACAAR, and with other key sector stakeholders including personnel from Faryab province. Many meetings were also held with key stakeholders and actors including Ministry of Mines, Ministry of Energy and Water, USGS, AGS, and World Bank. The team also met key sector stakeholders to learn about USAID, KFW, GIZ, EU, JICA; CIDA and other agencies how they work for capacity building in the sector.

Based on the discussions and meetings, an inception report has been developed.

It is clear that the TOR can be followed but more detailed planning work have to be done during the next planning phase outlining all the training activities, capacity building arrangements needs.

It is also observed that the coordination activities take time locally and that MRRD has need for increased capacity. Many new staff or trainees have been recruited and training is important to utilize this new capacity.

The chapters in the report outline the project understanding and how the team plans to implement the project. With the capacity and field support from DACAAR, the project will proceed well.

The hydrogeology programme is described in the report and survey arrangements to be followed. Some of the work is specifically for the specialists to develop knowledge about the ground water resources which the other important part is how to make the information understandable and readily available to the many actors developing water supplies in the rural areas.

The GIS and information system can fit well within the water sector and the MIS system in MRRD. The system platform has been discussed and plans are clear how this can be arranged. The challenge is to develop the capacity of expert MIS and GIS personnel to sustain the system and to remain in MRRD to keep continuity in the information service.

The Norplan team think that the best and most appropriate format for disseminate the hydrogeological information is to make a web based hydrogeological / water use atlas. With an information collection system developed, trained and in place the hydrogeological information will be readily available to all stakeholders and this is believed to be good solution.

We believe that this project will develop methodologies and information for many to use. The effectiveness of the project will hinge on stakeholders and potential users being informed about the project and participate in making the tools fit their needs. For that purpose, a project web page will be designed and launched as soon as possible into the next planning stage. This web page will be the property of MRRD with its own staff trained to run and maintain the site.

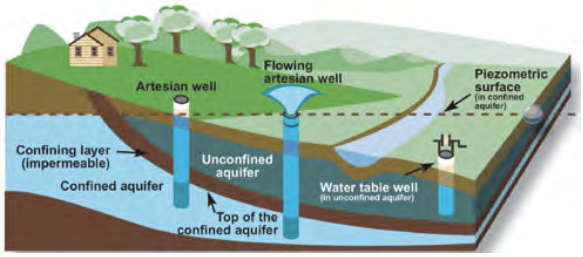
The project is now proceeding into the 6 months planning stage where hydrogeological methodologies will be developed, training material produced and GIS/MIS setup developed and ready for full use during the implementation phase to start at the end of the planning phase.

2 PROJECT CONCEPT, AND THE UNDERSTANDING OF KEY ISSUES, NORPLAN

Afghanistan has a population of close to 30 million and of these over 75% live in rural areas. Provision of safe drinking water is very important in the rural areas in Afghanistan with only 27% of the rural population has access to safe drinking water. That means that about 18 million people are still in need of safe water supply.

Since 2002, it has been estimated above 100,000 water points have been developed to cover as the main interventions for safe rural water supply. The technologies used has in the main been shallow hand dug wells or boreholes fitted with hand-pumps.

Now most of the readily available water sources have been developed and from now on ground water resources may be both harder to find and more costly to develop. In order to meet this challenge, knowledge and expertise is needed about the ground water sources. Such information has been difficult to obtain for small scale rural water supply development. In order to remedy this project takes up the challenge to develop a survey method that will assist in providing information of where ground water resources are likely to be available for development. If this information is available to most stakeholders, the sector would benefit greatly.



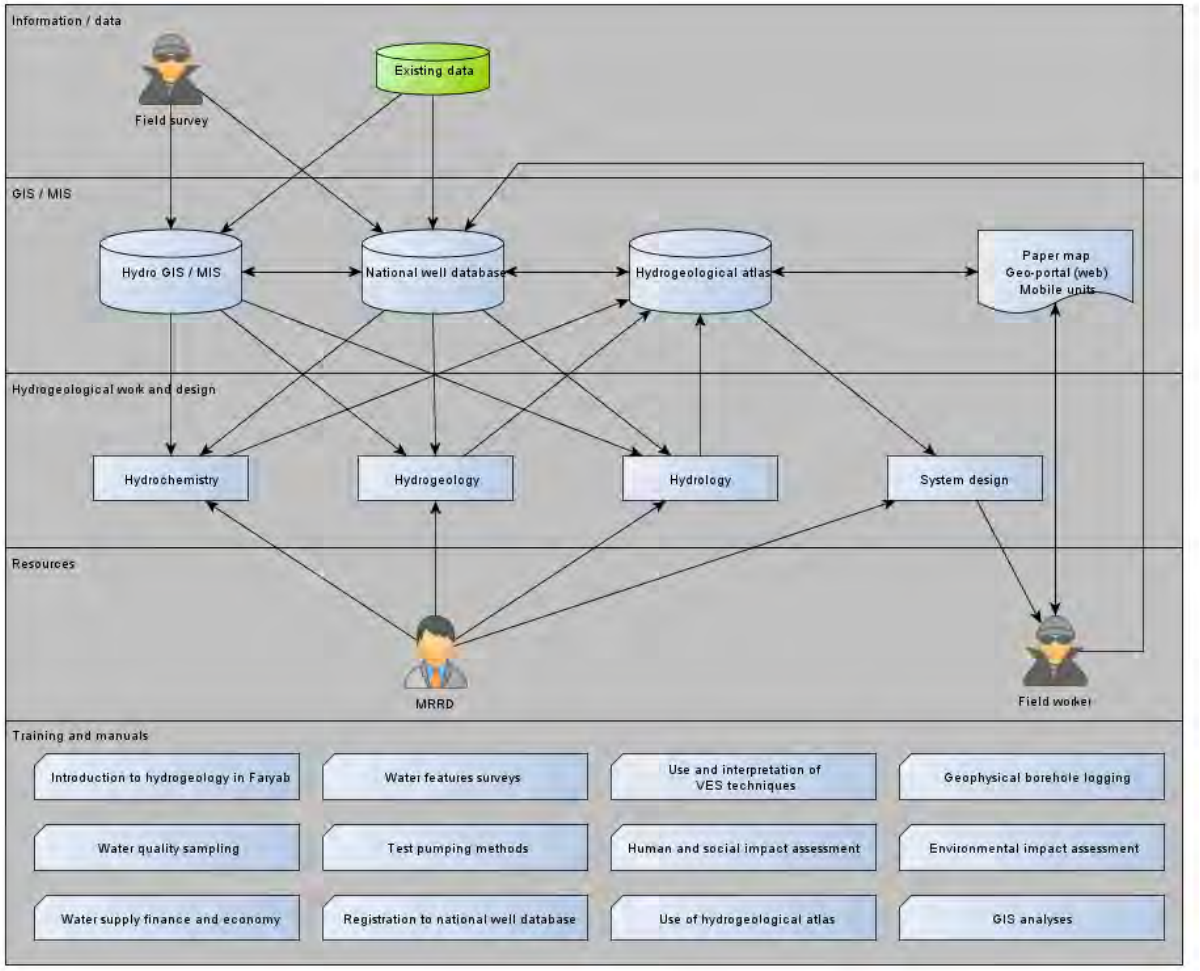
MRRD is the lead ministry handling community based rural water supply and sanitation. It is therefore most appropriate that support is provided to develop capacity and expertise for MRRD to develop good information system so as to take the lead in guiding all stakeholders if enhanced sector development.

The project has many components but one overlying theme which is capacity building for the rural water supply and sanitation sector. In the Government in Afghanistan, this falls under the Ministry or Rural Rehabilitation and Development, MRRD, which is the main single institution benefitting from the project.

2.1 Key project focus:

- Make a method for collecting data so we can make an atlas showing where ground water can be feasible to developed for rural water supply
- Train people at all levels so that this water information can grow to cover all of Afghanistan
- Use the good information gathered in the pilot province Faryab to prepare a design for water supply for three towns

Much of the work is about collecting, handling and organising data and information and making this useful for sector planners in Afghanistan. This is a big job and complicated if we are going to make sure that all information is well organised and updated for all to use.



In More Details

The diagram to the left outlines the key themes for the project which is HYDROGEOLOGY for the purpose of identifying water resources for rural water supply. This aspect has many subthemes including

- Data collection
- Data analysis
- Field survey
- Develop survey methodology
- Training of all types of personnel
- District & Provincial survey report.

The topic listed is Management information systems “MIS“ and Geographic Information systems “GIS”. For hydrogeological information to be useful, information has to be presented and communicated to user groups in a user friendly format. This means that the following needs to be covered:

- Study existing MIS and GIS systems
- Study existing information for use in future system
- Design of new MIS/GIS system
- Train staff for data collection and data entry
- Publish on web new Water use maps/atlas for pilot province
- Train staff at national level to replicate system for all provinces with nationwide coverage

The other activity which is also defined as a planning and preparation work is the survey, conceptual design and preliminary design of water supply and sanitation for three towns. It is still unclear as to which towns these are, but the towns should have a population size less than 5000 inhabitants. . In one place the three towns are described as towns with large water supply networks, while other places the issue of networks has not been mentioned. Although the naming and identification of the towns have not yet been made, the purpose of using the hydrogeological data and the information system developed under the project is very much appropriate. The challenge will be how to handle provincial expectations to the project when arranging a provincial project workshop at the beginning the planning period. Staff from Maymane was present in Kabul during the initial inception workshop. However, the Governor of Faryab and senior government provincial officers in the water sector will most likely have strong view and high expectations about the project in terms of service delivery. This activity will thus include

Survey existing town infrastructure and current service provision for water supply and sanitation

- Use updated information of available water resources including hydrogeological data to assess possible and suitable technologies which could be used.
- Develop a conceptual design using appropriate technical solutions for water supply and sanitation in line with the national WASH policies.
- With possible technology options and implication of technology choice and service level, conduct interactive planning with CDC, local communities to identify sustainable and desired options for development
- Present and plan for project management, ownership, operation and maintenance and consumer payment structure.
- Conduct financial analysis of service sustainability and possible cost sharing options
- Develop project budget for each town and project definition
- With endorsed project framework, proceed to prepare a preliminary town design for the three towns yet to be identified.

It is appreciated that at this moment in time, it is not possible to know needed resources for surveying and planning for water and sanitation services in the mentioned towns until the towns have been identified and scope of work defined. If the towns would be three of the larger towns in Faryab would be very different to plan for compared to the selection of district headquarters of smaller villages.

In our diagram below, we have highlighted Institutional Development. This is a term which covers very much including but not limited to :

- Capacity building (and training)
- Development of methodologies for use as guidelines for replication of work
- Development of training material to prepare trainers and trainer of trainers for new approaches and techniques
- Establish systems for collection and publishing hydrogeological planning information to support improved and accelerated water supply and sanitation development in rural areas.

- Support/establish good links and coordination between sector ministries and agencies and, major water programmes and public and private sector for use of hydrogeological data.
- Develop links between developed hydrogeological methodologies and established training institutions such as universities, polytechnics and other training water sector institutions.
- Capacity building also means acknowledging already established and functional institutions including
    - WASH policy framework
    - WSG coordination framework
    - MRRD policy formulation expertise and leadership
    - Further development of best practices in Afghanistan

Capacity building covers all stakeholdes and actors including government, key sector NGOs, training institutions, private sector whether drillers, contractors for water and sanitation implementation, training institutions, MIS and GIS - experts or consultants.

Training has a very important place in capacity building. For this project training is planning of water and sanitation services. For this project, training needs assessment has been undertaken and many staff have been identified for training. In the vertical line training start from the very top and national level to the field workers in the villages. Just to show what this can cover the following categories needs to be covered:

- Hydrogeologist (top national specialists) for investigations and analysis of hydrogeological information
- How to use existing information and data to analyse water resources in an area/ province
- How to prepare hydrogeological surveys in one or many provinces
- Water sector planners: how to use hydrogeologiocal information when planning water and sanitation services for smaller and larger settlements (at national and provincial levels)
- How to plan and conduct hydrogeological field work including data collection.
- Field data analysis
- Field data recording and registering in MIS and GIS at provincial/ national systems.-

2.2 . Sustainability of services.

Too many examples are available to demonstrate that implementation of physical facilities is so much easier and gives so much more immediate positive acclamation only to find that one or two years later all great expectations has collapsed. The services were not sustainable.

For this project we want to pursue this in the best possible manner to limit old mistakes in line with focus in the TOR.

- Developed methodologies and training material used should be available for all sector actors to use
- Developed methodologies for hydrogeological surveys should be given to national training institutions for teaching in Universities and Polytechnics and other institutions where appropriate
- Under- and post graduates should be involved in the project where possible
- A project web site will be launched to provide information to other stakeholders working with similar issues for the purpose of information dissemination and for invitation to provide advice of better solutions to resolve issues.
- The existing WSG sector coordinating committee structure will be acknowledged and built upon so that WASH policies, government and NGOs experiences and expertise will continue to be playing important work in the development.
- It is proposed to establish a longer term link to a water user organization in Norway, Norsk Vann, (owned by local authorities for the purpose of practical training of water and wastewater operators).

- It is proposed to establish a "water use atlas" to be published on the web for all stakeholders to use and access. The information will fall under MRRD but be free for all to use. In order to address problems of local computer experts leaving, a longer term link will be establish with an organization in Norway to provide support to assure that people are training in operating and managing the hydrogeological information system.
- Enhanced sustainability will also be achieved through close coordination with all major relevant water sector programmes so that activities developed under this project will be included in other projects. And likewise, important project components in other project will be included thin this programme. This should generate mutual interest so assure the project activities remain in use.
- As a logical follow- up of the above, it will be proposed that one to two districts in Faryab are selected for testing of the proposed future operation and maintenance system for rural water supplies using a combination of community, public and private sector.
- Provide support for sector staff to participate in national and international conferences to generate exposure and important sector networks.
- To provide support for English language courses for senior government staff for enhanced technical discussion as practiced in other water sector programmes both in national and international fora.
- To partake in discussion how to find intermediate solutions for attracting well qualified staff to government positions with least turnover

2.3 Good coordination and cooperation with sector activities which will influence the success of this project.

This project will hopefully develop planning tools which will help the water supply and sanitation sector. However, for the tools to fit, the larger potential users must be involved in the discussion of how the tools should work for use in their projects and programmes.

Examples of such are project activities as planned and implemented under NSP where rural water supplies have been developed in a large number of villages. Better planning data and water resource data/ hydrogeological data could assist the communities through advise from the facilitation partners about how best to develop the water resources.

The proposed Rural water supply/wells database to be funded by UNICEF and which may could be an extension of the WSG/ DACAAR wells data base could be great benefit be coordinated with this project. The Hydrogeological atlas will need a lot of information about groundwater availability and water quality in all districts, while the water assets database (WSG) will be more of a water supply management database. The two information databases are quite different, but the collection of the data could be organised thought the same institutions and staff. There is much to be gained by coordination and corporation here. It could be that while surveying the province in Faryab for the Hydrogeological database a little time extra would only be needed by the survey team to collect data that fit both databases. Perhaps if the HGS data gathering in Faryab assist in supplementing data for the WSG data base and train staff for this in Faryab, the UNICEF supported project could make reciprocal work in other provinces so as to extent the Hydrogeological atlas into other provinces at reduced costs?.

Another larger program in the pipeline is the WB/ARTF USD 50 million project planned for MRRD and rural water supply and sanitation activities and interventions. We believe that programmes of this scale would set the precedence on how projects will be implemented in the sector in Afghanistan once the project is on stream. Again, for the tool to be developed for the hydrogeological /water use atlas be sustainable, the tools must be used by the large project as part of the policy. Thus, for this to happen, close coordination with MRRD and project consultants should be arranged to assure that the Hydrogeological atlas is relevant for upcoming larger rural water supply projects in Afghanistan.

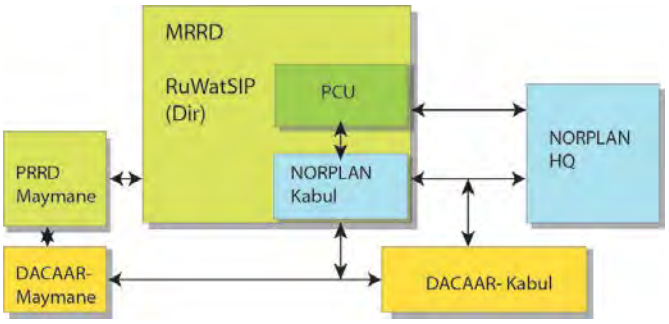
Finally, exchange of information with other ministries (Afghanistan Geological Survey/AGS) on how to organise training and capacity building should be pursued with other ministries and agencies for coordinated solutions for more effective development.

The project team also acknowledge that where work is linking to other ministries for jurisdiction of activities, they will be invited to participate and benefit for interventions proposed under this project.

2.4 Project management and security issues.

The project management arrangements are influenced by the security situation. As originally proposed in the TOR, two- three key international staff would be stationed in Kabul to assist with the implementation of the project. This arrangement has been modified to work as follows:

The international experts provide concepts and ideas about how to develop the project. These ideas are communicated to the client through the Norplan Kabul office located within the premises of MRRD. Through good Skype and internet, the international expert can, when not in Kabul, communicate through the deputy team leader to the project coordinator in PCU or other key personnel in the department. This works well.



This system also make project management handle periods of poorer security situation because qualified local personnel are on the spot to follow up issues as and when required on a continuous bases.

Arrangements have been made with DACAAR to cover Norplan staff with security advice in a continuous bases while in Kabul. The DACAAR security officer provides security brief to all international personnel on arrival and continuous information on SMS and email to Norplan personnel in Afghanistan.

In Norplan HQ, a person has been designated to follow up security issues for all staff including registration of staff with the Norwegian Embassy and providing updated information about the where about of personnel at any one time. The security officer in HG also check that staff insurance and coverage is taken care of.

In the Norplan Office, the following staff will be present:

- Deputy team leader (continuous)
- National training expert (part time)
- National GIS/MIS expert (part time)

In addition, office staff will be engaged for:

- Admin/ finance officer (recruited and joining office early April 2012)
- Logistics/ office support
- Cleaning
- Drivers (one for each car, 3)

2.5 Office and project equipment

For procurement of equipment for the inception, Norplan submitted a request for advance for the procurement of the equipment. Funds was released after 2,5 months in March 2012 and procurement

of office equipment and transport can now proceed. Procurement procedures have been developed for the project but focus has been on finalising the inception report rather than procurement.

3 THE HYDROGEOLOGY OF FARYAB PROVINCE: CURRENT UNDERSTANDING AND CHALLENGES

3.1 HYDROLOGY

3.1.1 Meteorology

Faryab province exhibits strong meteorological gradients, with lower average temperatures, moderate evapotranspiration and high precipitation (exceeding 600 mm/a) in the mountainous south, and higher average temperatures, high potential evapotranspiration and low precipitation (<200 mm/a) in the semi-desert north.

	Mean annual rainfall (mm)	Mean annual temperature °C	Mean annual potential evapotranspiration (mm)	Daily potential evapotranspiration (hottest month mm/d)	Daily potential evapotranspiration (coolest month mm/d)	Mean sunshine ratio
Maimana	354	14.4	1202	7.20	0.63	0.62
Shebirghan	231	16.4	1364	7.90	0.73	0.60

Table 3.1. Meteorological data for Maimana (Faryab) and Shebirghan (northern Jowzan) in the period 1958-78, after Favre and Kamal (2004).

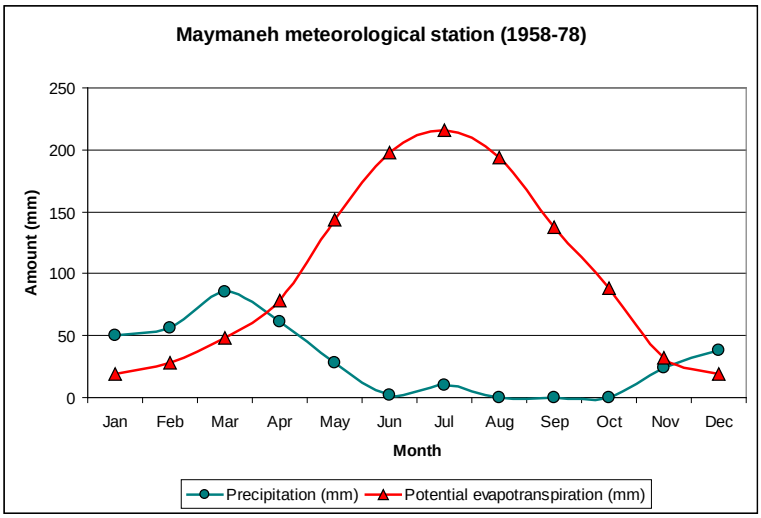


Figure 3.1. Mean monthly precipitation and potential evapotranspiration for Maimana meteorological station, after Hassan Saffi (2010a,b).

3.1.2 Shirin Tagab catchment

Faryab Province largely corresponds with the surface water catchment of the Shirin Tagab River. The Shirin Tagab take source from rises in the Hindu Kush massif in the south of Faryab and is believed to derive largely from (a) base flow from springs in the fractured and karstic aquifers comprising this region and (b) surface run-off and snowmelt from the mountainous terrain. The Shirin Tagab runs generally northward and, as it exits the mountainous terrain (underlain by Triassic, and Cretaceous and Palaeogene) rocks and flows onto the Neogene molasse sediments, an average annual flow rate of 4.45 m3/s has been measured at Khisht Pul gauging station (769 m asl; 35º57'N 64º54'E, data 1966-1978). The catchment upstream of Khisht Pul is 3280 km2, giving an average discharge of 43 L/m2/a (43 mm/a).

The average discharge at Khisht Pul reaches 8 m3/s during snowmelt (and, in some years, up to 16 m3/s) in April. During summer months, the typical flow rate drops below 2 m3/s (19 L/m2/a).

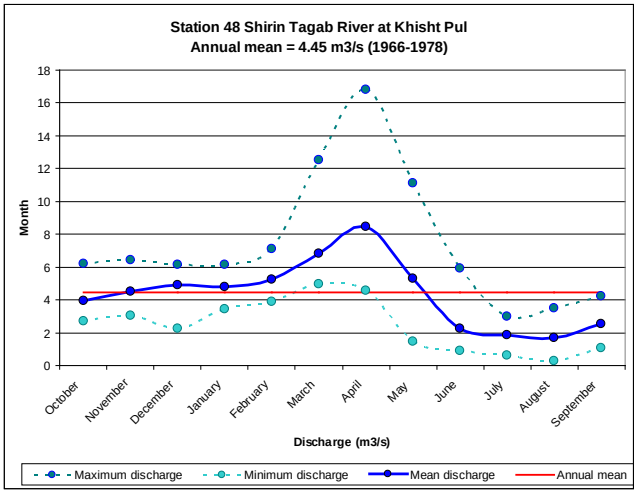


Figure 3.2. Monthly discharge in the Shirin Tagab River at Khisht Pul, from historic data.

As the Shirin Tagab flows northwards over the Neogene and Quaternary molasse and alluvial deposits, one would expect it to lose water by (see Figure 7.2):

(i) Infiltration into the Neogene and Quaternary aquifers, where groundwater heads are typically 15 to 40 m bgl);

(ii) Evaporation

(iii) Abstraction for irrigation (and thereafter further loss to infiltration of evapotranspiration)

and to gain water from

(iv) inflows from tributary branches

At Dowlatabad gauging station (391 m asl, 36º27'N 64º53'E, data 1969-1978), the annual mean discharge has dropped to 2.34 m3/s.

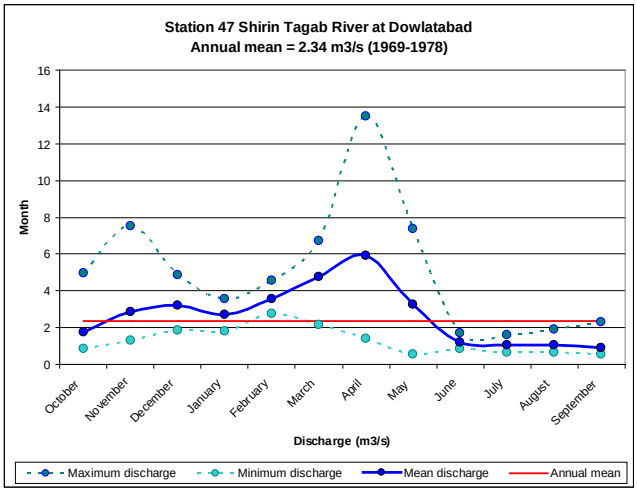


Figure 3.3. Monthly discharge in the Shirin Tagab River at Dowlatabad, from historic data.

By Pata Baba (371 m asl, 36º35'N 64º52'E, data 1964-78), downstream of the confluence with the Maimana River, the average annual flow has risen again to 3.98 m3/s, due to the contribution from the tributary (at least 1.6 m3/s on average), although the river almost dries in summer in drought years.

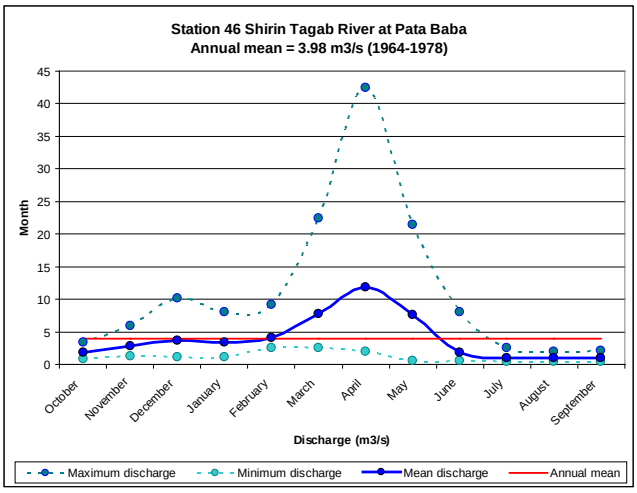


Figure 3.4. Monthly discharge in the Shirin Tagab River at Pata Baba, from historic data.

The Shirin Tagab continues to flow northward, losing flow, until it dries up in a network of distributaries channels and irrigation ditches (an inshore "delta") in the desert north of Andkhoi. The geological map shows no continuous deposit of recent alluvium between Andkhoi and the Amu Darya. Thus, it does not appear that the Shirin Tagab has regularly reached the Amu Darya in historic times and thus that its disappearance in the desert is essentially a natural phenomenon. Indeed, CA Water (2012) cites the Shirin Tagab as belonging to the "pre-Amu Darya" river system, and indicates that, at times of high discharge, the river flows into a closed basin north of Andkhoi. In exceptionally high flood years (most recently in 1907 - Berg 1950), discharge from the northern Afghan rivers may have reached the Kelif Uzboy, a palaeochannel of the Amu Darya which, in the geological past, is presumed to have intercepted flow and led it in the direction of the Caspian Sea (Létolle et al. 2007).

The major tributary of the Shirin Tagab is the Maimana River, which is, in turn, fed by numerous tributaries emerging from the foothills, including the Qaysar and the Almar.

3.1.3 Murghab River catchment

The mountainous southern district of Kohistan forms part of the upper catchment of the Murghab River. This is fed by baseflow from karstic springs derived from the Cretaceous / Palaeogene limestone aquifers underlying much of Kohistan's terrain and by snow melt and surface run-off. The Murghab at Qala i Niazkhan (800 m asl, 35º02'N 64º01'E, data 1966-78), located some 45 km SW of Kohistan, in Badghis province, has a mean annual flow of 46.8 m3/s for a catchment of 13,805 km2 (107 L/m2/yr or 107 mm).

Ghormach district and the western parts of Almar and Qaysar district also drain westwards into the River Murghab catchment, via its tributary, the Chichaktu (or Ghormach) River. At the Chichaktu gauging station, in Qaysar district, the annual mean flow rate is 0.76 m3/s.

The confluence of the Chichaktu with the Murghab is in Badghis province, whence the Murghab flows north-west into Turkmenistan, and is lost in a network of distributaries and irrigation channels in the vicinity of the city of Mary, on the line of the Kelif Uzboy channel.

3.2 Geology

Faryab province lies in the northern foothills of the Hindu Kush (Safed Koh) orogenic belt.

Petroleum geologists regard the ”basement” of the Faryab region as comprising rocks of Triassic and older age. Such rocks outcrop only in a faulted inlier representing a mountainous ridge (the Band-e-Turkistan), rising to over 3000 m, along the southern borders of Qaysar and Pashtun Kot districts and the northern border of Kohistan district. These Triassic rocks are dominated by sandstones and siltstones.

The faulted inlier of Triassic rocks is flanked by Cretaceous rocks comprising sandstones and siltstones, overlain by late Cretaceous / Palaeocene limestones, marls and dolomites.

These Cretaceous-Palaeocene limestones, marls and dolomites occupy most of the territory of Kohistan district south of Band-e-Turkistan, into which the courses of the Murghab River and its tributaries are incised.

The Cretaceous-Palaeocene limestones, marls and dolomites also underlie a significant proportion of the mountainous terrain over 2000 m asl immediately north of Band-e-Turkistan, especially towards the east.

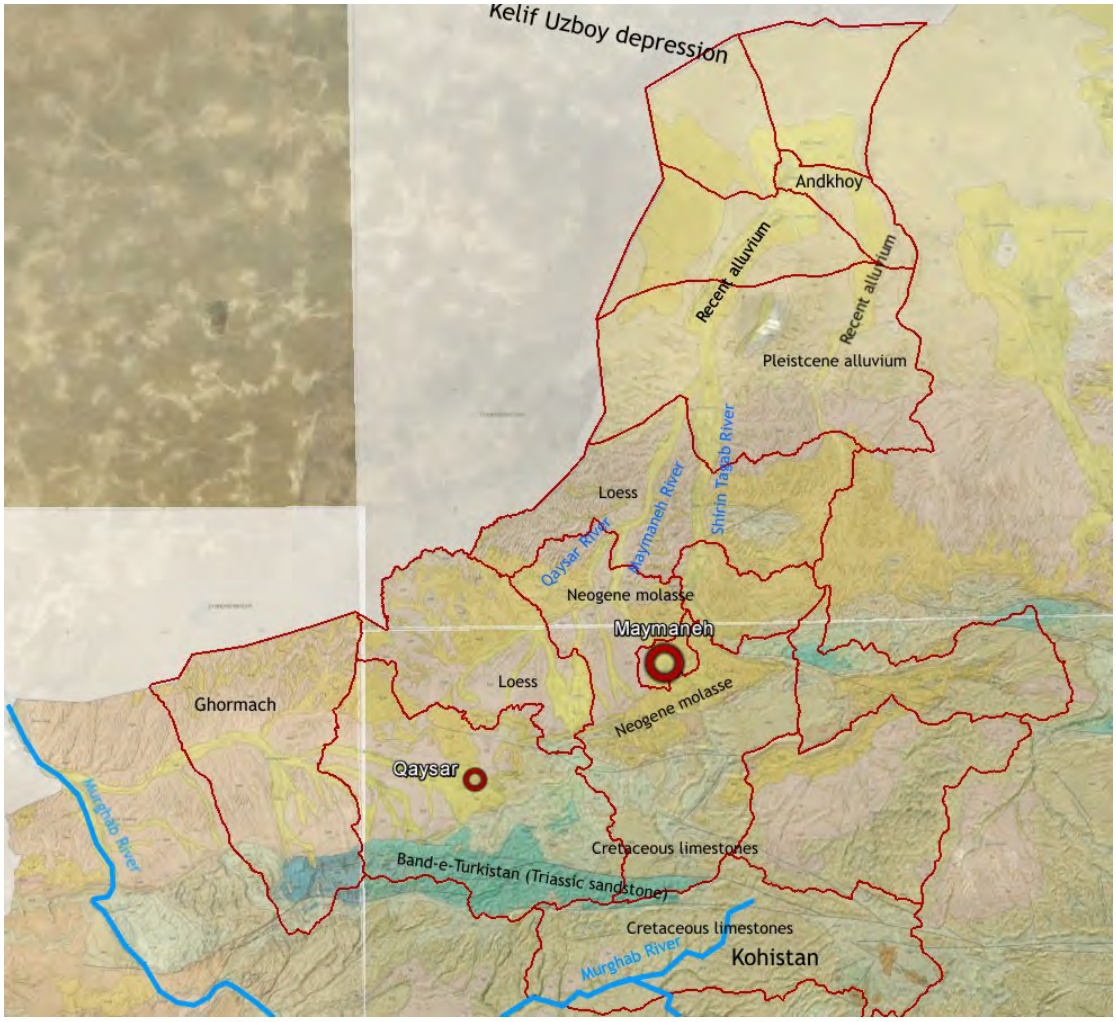


Figure 3.4. Satellite imagery (Google Earth) overlain by public domain 1:250,000 USGS geological maps (McKinney & Lidke 2005, McKinney & Sawyer 2005, Wahl 2005), indicating the main geological units considered.

The main Himalayan - Hindu Kush orogeny commenced towards the end of the Palaeogene period. During this time, the marine sediments of the Mesozoic were deformed and thrust into the emerging mountain chain. As the mountain chain emerged, rapid weathering began and vast fans of proluvial[1] sands, gravels and silts (termed molasse) were washed northward out of the mountain chain and now exist as huge tracts of Neogene sediments and sedimentary rocks below 1200-1500 m altitude to the north of the upthrusted Cretaceous / Palaeocene limestones. In many places, these deposits are covered by Quaternary Pleistocene loess.

Erosion of the mountain belt continued into the Quaternary and, still further north, (below around 600 m asl), plains of Pleistocene (Q3) sandy and gravelly alluvial material dominate. These widespread deposits may be classified as deluvium .

These Neogene and Quaternary erosional ”molasse” materials were deposited in a downwarping synformal basin (the Dowlatabad Depression of the Amu Darya Basin) and hence would generally be expected to have a weak dip towards the north (in fact, at the very northern part of Faryab Province, north of Andkhoi, small outcrops of Cretaceous and Tertiary sedimentary rocks are once again observed, indicating the northern edge of the synformal basin - the so called “Andkhoi High”).

Following the climatic warming of the Holocene, river flows will presumably have diminished and tracts of recent (late Pleistocene / Holocene Q¬3-4) gravelly/sandy alluvium are confined to the valleys of the main contemporary watercourses (the Shirin Tagab, the Maimana and the Qaysar).

In the semi-desert areas in the extreme north of the province, wind activity has resulted in the deposition of windblown sand dunes, while the evaporation of the main surface water courses in the desert has resulted in the formation of areas of salt-pan and salt marsh (takyrs and solonchaks).

3.3 Hydrogeology

The conceptual framework for understanding the hydrogeology of Afghanistan was laid down by Soviet-trained hydrogeologists in the 1970s (Abdullah and Chmyriov 1977).

The southern part of Faryab Province falls within the Hindu Kush massif, which contains broadly three different aquifer types:

a) Fractured rock aquifers, such as the Triassic and Cretaceous sandstones and siltstones, where groundwater flow largely takes place through fracture systems.
b) Karstified aquifers, such as the Upper Cretaceous / Palaeogene limestone, dolomite and marl aquifers, where groundwater flow largely takes place through fracture systems which have been

[1] [1] **Proluvium**: a Soviet geological term used to describe alluvial fan deposits forming as outwash from mountain massifs - “*loose formations that are the products of rock fragmentation and that are carried by streams of water to the foot of highlands. Proluvium forms alluvial fans and, where they merge, proluvial trains. The texture of the detrital material changes from pebbles and gravel with fanglomerates at the top of the fan to finer, more highly sorted sediments, frequently loess-like loams and sandy loams (proluvial loesses), at the bottom. Proluvium is most fully developed in the foothills of arid and semiarid regions where aleurite-clay sediments (frequently gypsumized and salinized) from flash floods sometimes form on the periphery of the area of proluvium distribution*”. The Great Soviet Encyclopaedia (1979).

[1] Deluvium: “*an obsolete term that was used in geology as a synonym for the Pleistocene epoch*” The Great Soviet Encyclopaedia (1979). It is also “*for superficial deposits formed by flood-like operations of water, and so contrasted with alluvium or alluvial deposits formed by slow and steady aqueous agencies.....In the late 20th century Russian geologist Alexei Rudoy proposed the term "*diluvium*" for description of deposits created as a result of catastrophic outbursts of Pleistocene giant glacier-dammed lakes in intermontane basins of the Altai*” (Wikipedia).

karstified (dissolved to form larger fissures) to a greater or lesser extent. Such aquifers can give rise to substantial springs. These supply a large part of the baseflow which supports the main watercourses of the province.

c) Intermontane valleys filled with Neogene or Quaternary basin / valley fill deposits (such as molasse or alluvium)

The northern part of the province is underlain by the molasse / alluvial basin derived from the erosion of the Hindu Kush. The aquifers of this part of the province can be summarised as follows:

d) Deep, confined, thermal Jurassic and Cretaceous sedimentary aquifers (at depth below the Neogene / Quaternary cover). These are not exposed in the northern part of Faryab region.

e) Confined Cretaceous / Palaeogene limestone / dolomite aquifers. These are only sporadically exposed in the northern part of the province (a large inlier to the north of the Astana Valley in Shirin Tagab District and in the far north, north of Andkhoi, adjacent to the Amu Darya).

f) Neogene molasse deposits. These are largely regarded by Afghan hydrogeologists as containing a greater proportion of silty and clayey material than the Quaternary deposits and are reddish in colour. They are reported to contain gypsum and halite minerals and often yield saline water, even in the southern part of the molasse basin near the foothills of the mountains.

g) Quaternary alluvial deposits. These can be subdivided into (i) Pleistocene outwash deposits, forming the majority of the northern plains, and (ii) more recent river valley alluvium, restricted to the main river corridors. The Quaternary deposits contain a high percentage of sand and gravels and often contain fresh groundwater reserves in the vicinity of the main river valleys. Away from the main valleys, and in the north of the molasse basin (Dowlatabad District and northwards) the Quaternary deposits, too, can contain saline or brackish groundwater.

Groundwater levels in the molasse / alluvial deposits are typically 10 to 35 m below ground level. The deepest groundwater levels are in the alluvial fan deposits in the south of the basin, where the main rivers emerge from the mountains, and where groundwater levels of 25 to 60 m bgl can occur.

3.3.1 Groundwater Recharge

It will be seen from Figure 3.1 that, even in the relatively moderate climate of Maimana, potential evapotranspiration exceeds precipitation for eight months of the year. As direct recharge can only occur when precipitation exceeds evapotranspiration and when the soil moisture deficit is satisfied, the opportunities for direct recharge are very limited.

Further north in the Province, evapotranspiration is likely to exceed precipitation for most of the year and direct recharge is rather unlikely (on the contrary, evaporation of precipitation will cause the accumulation of atmospheric salts in the soils).

South of Maimana, in the mountain region, precipitation will exceed potential evapotranspiration for more of the year, direct recharge can occur and, indeed, groundwater baseflow from the Mesozoic aquifers can be assumed to support spring and river flows.

In the molasse / alluvial basin of the north of the Province it is likely that indirect recharge is the dominant source of aquifer recharge. By indirect recharge is meant the infiltration of river water into alluvial fan deposits as the rivers emerge from the mountain massif. One may cite three lines of evidence for this assertion:

1) The fact the groundwater levels in the molasse / alluvial aquifers are typically > 10 m below ground level (and up to 60 m bgl in the alluvial fans in the foothills of the mountains). There is thus a clear hydraulic gradient from the rivers to the aquifers and the rivers would be expected to lose water as soon as they emerge from the mountains.
2) The fact that there is almost no seasonal response to rainfall recharge in the groundwater monitoring wells in the alluvial aquifers.
3) The fact that fresh groundwater reserves only occur along the main river valleys in the molasse / alluvial basin, indicating infiltration of fresher river water to a predominantly saline aquifer.

3.4 Hydrogeochemistry

A plot of electrical conductivity (an indicator of water salinity) of groundwater in Faryab reveals a strong tendency for groundwater salinity to increase northward (Figure 3.5).

(i) In the mountainous provinces (Gurziwan, Qaysar), the groundwater (largely derived from limestone aquifers in areas where precipitation exceeds potential evapotranspiration for much of the year), the groundwater is relatively fresh (<1500 µS/cm).

(ii) As the main northward-draining rivers emerge from the mountains and begin to infiltrate into the alluvial / fan deposits, around Maimana, Khwaja Sabz Posh and Pashtun Kot), there is still a strong likelihood of encountering groundwater with an acceptable salinity, especially in the vicinity of the main river valleys).

(iii) Further northward, (Shirin Tagab District and northward), the groundwater becomes ever more saline. Indeed, in the Shor Darya Valley (containing the combined flows of the Maimana and Qaysar Rivers) of Shirin Tagab District, the groundwater is now unacceptably saline. Indeed, the waters of the Shor Darya itself have a salinity of >5000 µS/cm (Hassan Saffi 2010b), at least for some of the year. Even in the main Shirin Tagab River valley, many of the wells are unacceptably saline in Shirin Tagab District.

(iv) In Shirin Tagab Province, away from the main river valleys, groundwaters are unacceptably saline, in both Neogene molasse and Cretaceous / Palaeozoic limestone aquifers. The Astana River, which is not derived from the main Bund-e-Turkistan range, but rather drains from Neogene terrain, contains highly saline surface water and groundwater (Hassan Saffi 2010a).

(v) In Dowlatabad District and, especially, the four northern districts around Andkhoi, the groundwater is unacceptably saline, even in the main Shirin Tagab valley.

It has been commonly assumed that the water salinity is derived from the gypsum and halite mineralization found in some of the Neogene deposits. While this may be a part of the explanation, we believe that this mechanism cannot wholly explain the salinity distribution seen above. Rather, it is believed that evaporative up-concentration of atmospheric salts in precipitation and accumulation and leaching of the resultant salts in the soil is more plausible, for at least two reasons:

(1) Dissolution of pre-existing gypsum and halite would be expected to result in high concentrations of chloride in the waters. In fact, many of the saline groundwaters are sodium sulphate-dominated (Hassan Saffi 2010a,b), with only modest chloride. The type of mechanism proposed by Parnachev et al. (1999) and Banks et al. (2004) for the evolution of alkaline sodium-sulphate waters in Central Asian climates is regarded as a more plausible model.
(2) The fact that saline groundwaters are not restricted to Neogene deposits, but are also found in Quaternary alluvium and Cretaceous limestones (north of the Astana valley), with no contact with the Neogene.

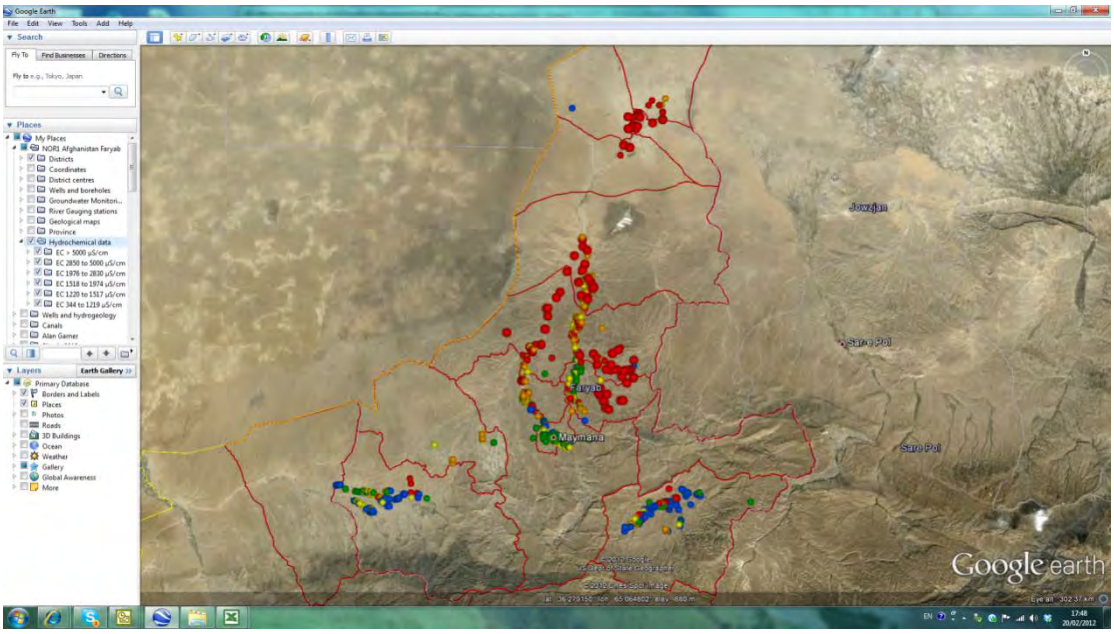


Figure 3.5. Demonstration of how Google Earth could be used to visualise hydrochemical data. This screen shot shows the electrical conductivity of groundwater in 1103 groundwater points, data kindly provided by M Hassan Saffi of DACAAR. Blue = 344 to 1219 µS/cm, green = 1220 to 1517 µS/cm, yellow = 1518 to 1974 µS/cm, orange = 1976 to 2830 µS/cm, red = 2850 to 5000 µS/cm, large red = > 5000 µS/cm.

Evapotranspirative up-concentration of such waters can also result in excessively high concentrations of other, health-related parameters, especially fluoride (and potentially also arsenic).

Contamination of groundwater by nitrate, likely derived from sewage and latrines, beneath major population centres, such as Maimana, is also cited as a concern.

4 WATER SUPPLY AND DEMAND IN FARYAB

According to MRRD's (2007) Provincial Profile, the population profile of Faryab is as follows:

District	Male	Female	Total
Maimana	34447	33608	68055
Pashtun Kot	81703	76547	158250
Khwaja Sabz Posh	23214	22054	45268
Almar	31148	30752	61900
Qaysar	59910	57567	117477
Kohistan	27103	26513	53616
Gurziwan	36745	35752	72497
Bilchiragh	21168	20538	41706
Shirin Tagab	36164	34900	71064
Dawlatabad	21203	20875	42078

Qaramqol	7927	8171	16098
Khani Chahar Bagh	8523	8420	16943
Andkhoi	20789	20867	41656
Qurghan	13278	13838	27116
Total	**423322**	**410402**	**833724**

Table 4.1. Faryab Province population, by District according to MRRD (2007)

This population represents a total of 121625 households, each with an average of around 7 members. Around 89% of the population lives in rural areas, while 11% lives in urban areas.

Around 23% of households are reported by MRRD to use safe drinking water (50% in urban areas, 21% in rural). 65% of households have direct access to their main source of drinking water within their community, while 22% of households must travel for up to 1 hour to collect drinking water, 7% must travel up to 3 hours and 4% must travel up to 6 hours (NRVA 2005).

As regards drinking water, springs, dug wells and tube wells fitted with hand pumps are the most common sources. Rainwater cisterns are also believed to be used, and these may represent important sources in saline regions. Relatively few motorised borehole schemes exist. Even the provincial capital Maimana lacks a fully developed urban water supply scheme, although plans for such a scheme have long been tabled (Skomarovskii et al. 1987). A more recent groundwater supply feasibility study was prepared for the town of Maimana in 2005, arriving at a total budget of $5.8 million, to be financed through the Afghanistan Reconstruction Trust Fund. Three deep wells were drilled along the river just outside town.

In the four northern districts, a lack of natural fresh raw water has forced the development of a pumped piped supply scheme taking fresh water from well fields adjacent to the Amu Darya. At present, this piped scheme has been constructed to bring water to Andkhoi city and further development in forthcoming years is planned to distribute this water within the four northern districts.

Only 2% of households had access in 2005 to ”safe” toilet facilities (10% in urban areas, 1% in rural). 79% of households used a traditional covered (presumed ”vault” type) latrine, 13% used an open pit, 4% used a dedicated area in their compound (not a pit), 2% used an improved ”sanitary” latrine, 2% practiced open defecation, while practically none had access to a flush latrine (NRVA 2005).

In 2005, 17% of households had access to electricity (64% in urban areas, 12% in rural).

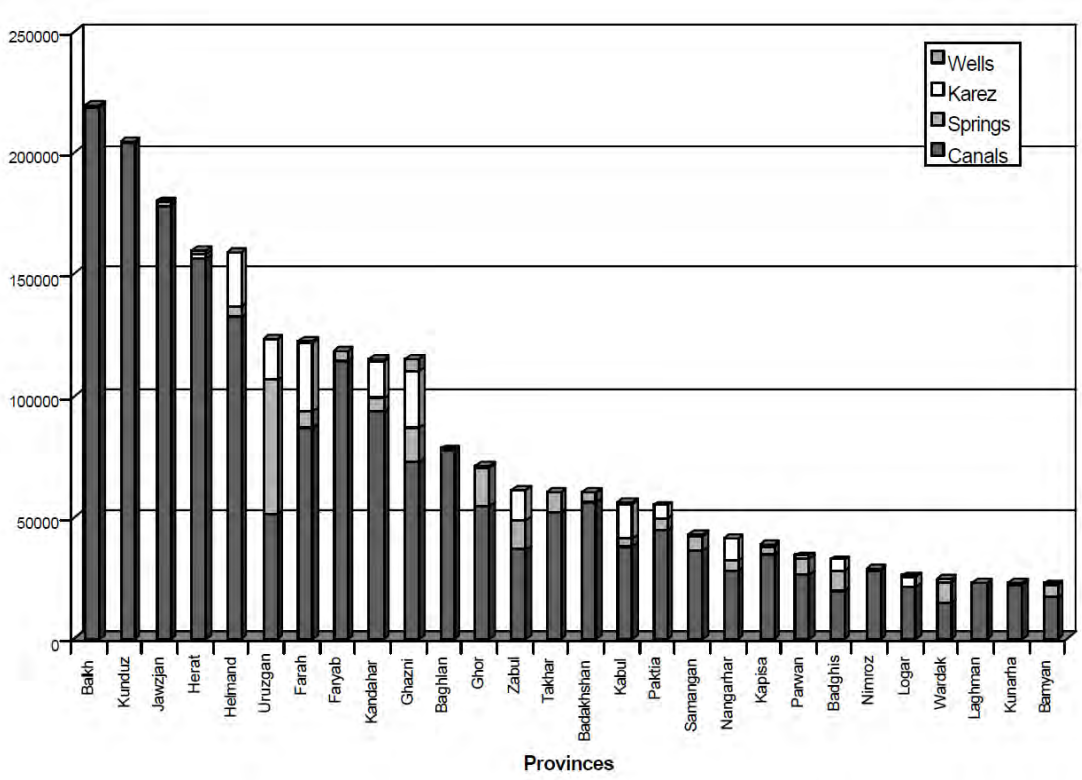


Figure 4.1. Areas of irrigated land (Ha) irrigated by different irrigation sources in Afghanistan (after Qureshi 2002), by Province.

The most important field crops grown in Faryab province include wheat, barley, maize, potatoes and flax. Garden crops include grapes, nuts, fruit and vegetables. In rural areas, 44% of households have access to irrigated land, while 57% rely on rain-fed arable land. While much of the irrigated land is fed by a network of canals and ditches drawing water from the main rivers (a network which extends north of Andkhoi), some irrigation is accomplished by groundwater - the available data are quite old, however, dating from 1967-68 (Shobair 2001). At that time, some 4900 Ha (4% of the total irrigated land) was irrigated by groundwater sources.

	Springs	Karezes	Shallow wells	Total groundwater
Number	79	960	867	
Area irrigated (Ha)	4,250	380	270	4,900
% of total irrigated	3.5	0.31	0.2	4
Area per spring/karez/well (Ha)	53.8	0.40	0.31	

Figure 4.1. Areas of irrigated land (Ha) irrigated by different irrigation sources in Afghanistan (after Qureshi 2002), by Province.

4.1.1 Water Resources Issues

It is important to recognise that the plains of northern Faryab represent a marginal environment for human existence. Comparison of the extent of modern river valleys with the vast tracts of alluvium deposited during the Pleistocene should emphasise the fact that (natural) climate change towards a

warmer, less glaciated climate has led to a marginal water resources situation, where populations on the northern plains are almost wholly dependent on:

(i) snowmelt-fed run-off from the mountains, discharging along the main northward-flowing rivers (the Shirin Tagab, the Maimana, the Qaysar, the Almar), supplemented by limited quantities of groundwater-supported base flow from the mountain region aquifers in the drier seasons.
(ii) pockets of fresh groundwater recharged by infiltration along the courses of the main rivers.

Groundwater salinity: The main groundwater-related challenge is perceived to be that of **groundwater salinity**, which is believed to have its roots in the evapotranspirative up-concentration of atmospheric salts in soils, possibly exacerbated by the presence of ”fossil” evaporite minerals. Such evaporative up-concentration can significantly increase concentrations of solutes such as boron, fluoride and arsenic, which can be harmful to human health or plant life. Concentrations of fluoride in excess of 5 mg/L have been recorded in the Andkhoi area. Such salinity is extremely difficult to remove in bulk. Norwegian Church Aid and its partners have implemented a technically successful project in the northern districts of Faryab to run electrically-powered reverse osmosis plants to desalinate groundwaters. According to Prof. MH Hamid, 7 such plants have been installed to date, each providing some 0.3 to 0.4 L/s of water and serving 2370 families. According to M Hassan Saffi (DACAAR), the electricity consumption of each plant is 4.5 kWh per m3 of water. Solutes are typically reduced in concentration by a factor of 10. Such a system depends on the availability of cheap, reliable electricity (in the case of the NCA systems, supplied from the main line from Turkmenistan). The potentially high running and maintenance costs suggest that this may not be an economically sustainable option, if the users are to bear the full running costs of the system (in line with MRRD’s 2010 WASH policy).

Groundwater contamination: DACAAR have recorded elevated concentrations of nitrate in groundwater (up to c. 20 mg/L NO¬3) in groundwater below Maimana (Hassan Saffi 2008). The most obvious source of this nitrate is intensive disposal of excreta in latrines. Hassan Saffi (2008) also records excessive levels of faecal coliforms in groundwater samples from Faryab, especially from wells in the main river corridors of the Maimana and Shirin Tagab rivers. This may reflect poor well completion and protection, rather than widespread groundwater contamination.

Potential groundwater flooding and salinisation: A major scheme is currently underway to import fresh water from well fields adjacent to the Amu Darya to Andkhoi and the four northern districts of Faryab. Experience from other semi-desert areas of the world suggests that large scale importation of fresh water and a resultant significant increase in usage may lead to an increase in recharge of water to the ground (disposal of used water), a rise in water table, and the potential risk of groundwater flooding and additional groundwater salinisation (as rising water levels encroach on saline soil horizons).

Groundwater resources availability: In realty, the major challenge in Faryab is one of groundwater availability. The sustainable rate of groundwater abstraction from the Neogene and Quaternary aquifers is not known, for the simple reason that groundwater recharge has never been even approximately quantified in a convincing manner. It is reasonable to assume that groundwater recharge is rather limited, due to (i) the very low seasonal fluctuations in groundwater hydrographs; (ii) the very limited pockets of fresh groundwater along the river valleys; (iii) the very low observed groundwater levels. Responsible NGOs have taken steps to deliberately prevent the over-abstraction of groundwater: in the case of Norwegian Church Aid (NCA) their work has focussed on rehabilitation of spring catchments and dug wells, rather than the drilling of new boreholes. While DACAAR do engage in the drilling of deep boreholes, these are always designed to be fitted with handpumps and are deliberately restricted to 100 mm diameter to hinder the fitting of motorised pumps. The consequences of large scale abstraction from motorised boreholes have been documented by Banks and Soldal (2002): the local effects may include the drying up of traditional springs, karezes and dug

wells. Equally importantly, the large-scale abstraction of groundwater to feed larger communities or irrigate land risks depleting an already limited fresh water resource and inducing inflow of saline water.

5 STAKEHOLDERS AND MODES OF OPERATION IN RURAL WATER SUPPLY

In most countries, including Norway and the UK, responsibility for management of water resources does not always fall neatly within the remit of a single government ministry or department. In Afghanistan, however, the situation is extremely complex:

The Ministry of Water and Energy (MoWE) has an overall responsibility for monitoring and management of water resources/River basins in Afghanistan.

The Ministry of Mines (MoM) has, however, assumed a role in the mapping and surveying of groundwater resources. The Ministry issues licenses for drilling and most new boreholes should formally be reported to MoM.

The Ministry of Irrigation and Livestock (MAIL) has a responsibility for ensuring adequate provision of (largely) surface water resources to agricultural interests.

The Ministry of Rural Rehabilitation and Development (MRRD) has a responsibility for planning, coordinating, facilitating and monitoring the provision of infrastructures in Afghanistan's rural communities, including water supply and sanitation. It is tacitly accepted that MRRD should have a mandate to plan and develop rural water supply systems (and most small-scale, handpump-based, groundwater supplies are exempt from MoM permitting). MRRD has the chair for sector coordination though the Water and Sanitation Group (WSG) which is a coordination structure that coordinates and exchanges information about sector development. Furthermore the WSG is important as an advisory framework for assisting Government in developing water sector policies for rural water supply and sanitation activities.

The Ministry of Urban Development (MoUD) has a corresponding responsibility for providing services, including water supply and sanitation, to the major urban centres.

The National Environmental Protection Agency (NEPA) has a national pollution monitoring and control mandate and they have, effectively, taken responsibility for water quality monitoring of surface waters.

The Ministry of Public Health (MoPH) has a public health mandate as far as the provision of water supply, sanitation and hygiene services is concerned.

At provincial level, a similar departmental structure mirrors these ministries. Thus, a provincial department of rural rehabilitation and development (PRRD) has responsibility for rural infrastructure in Faryab. The PRRD has a direct management line to the Provincial Governor's office, however, and not to MRRD. The relationship of PRRD to MRRD is essentially a policy line.

Rural water supply is typically implemented according to three models, of which the first two are indicated in Figure 5.1.

Model 1: The National Solidarity Programme (NSP). The NSP attempts to devolve decision-making to a local, village-level Community Development Committee (CDC). The MRRD typically involves a

facilitating partner (e.g. an International NGO) to facilitate the NSP within a specific district of the Province. Once a village has been prioritised for the NSP, a CDC is formed and charged with responsibility for choosing how to allocate "their" NSP funds. The village may or may not choose to spend funding on water supply or sanitation infrastructure. Having made this choice, the CDC will appoint a contractor (facilitated by the NGO partner) to carry out the works. In this model, the PRRD is not involved.

Model 2: Rural Water Supply, Sanitation and Irrigation Programme (RuWatSIP). This is a more conventional top-down approach. Communities may apply to the Provincial Governor for assistance, via the PRRD. The MRRD's RuWatSip office may then provide advice (hydrogeological, geophysical services) and support to the PRRD, who may then appoint an external contractor to carry out the works. Alternatively, the MRRD may carry out works themselves, in collaboration with PRRD, using their own drilling rigs.

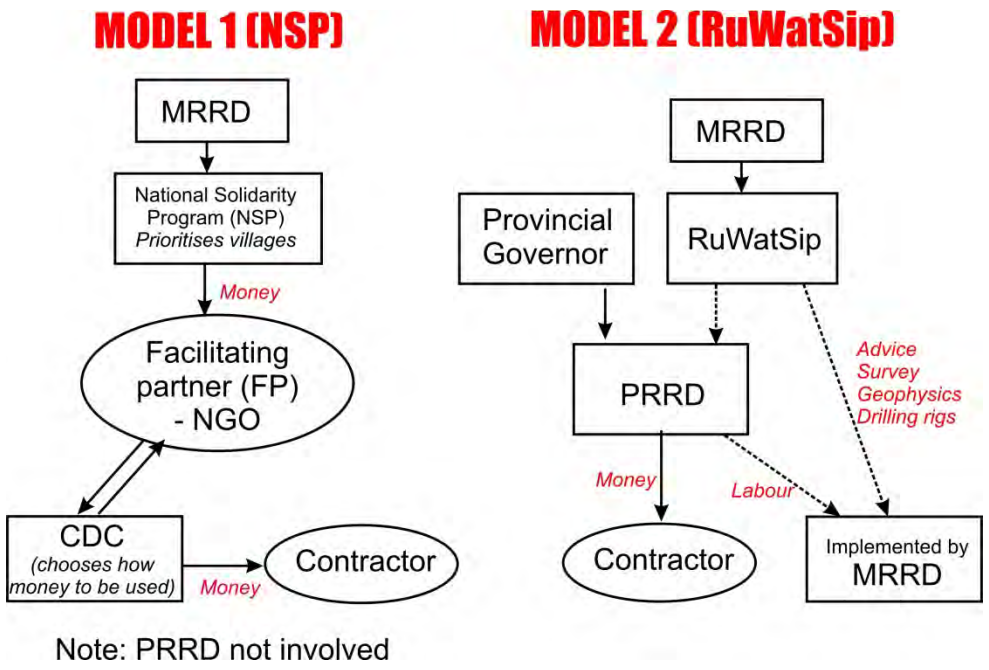


Figure 5.1. Schematic diagram of modes of operation of MRRD in water and sanitation projects.

Model 3: Bilateral Aid programmes. Several international NGOs have separate agreements with MRRD to implement water and sanitation projects in Faryab Province. USAID has a major program in Faryab, with a water and sanitation component, partly implemented by the NGO Association for Rural Development (ARD) and partly by International Relief and Development Inc. (IRD). US AID has also funded a "Watertracker" online database (www.watertracker.af), which registers wells and waterpoints and their functional status. This project must clearly aim not to overlap, but rather complement and integrate, with the Watertracker concept.

The Norwegian Government's water and sanitation assistance program in Faryab is implemented by:

- Norwegian Church Aid (NCA), especially in the four northern districts of Khani Chahar Bagh, Qaramqol, Qurghan and Andkhoi, but also in Bilchiragh, Kohistan and Pashtun Kot, via their partner organisations
  - Norwegian Project Office, Rural Rehabilitation Association (NPORRA)
  - Coordination for Afghan Relief (COAR)

- DACAAR (directly) in several of the provinces not served by NCA, but especially in the areas around Maimana (Pashtun Kot, Maimana).

Other NGOs active in the water and sanitation sector in Faryab include InterSOS, ACTED, UNHCR, UNICEF, IOM, CHA and German Agro-Action (GAA).

Other sector activities which could influence the standing of this project

UNICEF has long been a solid supporter for water and sanitation activities in Afghanistan. UNICEF has furthermore been on or the key organization providing continuous support to MRRD and the RuWatSIP. This has been in form of support for capacity building of the department, funding of specific projects implemented through MRRD or through training activities for the department. We understand that UNICEF could be providing support for MRRD to implement a water supply database covering all the water points in the country in line with the WASH policy for registration of such facilities. The establishment of this data base could be quite complementary to the Hydrogeological database with the proposed water use atlas to be covered under this project. The UNICEF supported database would possibly be the extension of the DACAAR wells database which today covers over 40000 records. Thus the training of staff and use of infrastructure be complementary and thus the different activities and projects would thus support each other.

ARTF/WB proposal for support to the MRRD and the Rural Water supply sector in Afghanistan.

MRRD has previously implemented projects funded though the ARTF. Discussion are now in progress for USD 50million support to rural water supply and sanitation activities in line with the WASH national policy framework. Large investment is certainly needed in order to increase coverage of safe water supply and sanitation. With this project possibly in the pipeline, the methodologies developed under the HGS study could be most appropriate for use and replication of the rest of the country if found suitable. Good coordination is important in order to have best possible synergies. This should be anticipated since MRRD is leading both project activities as well as leading the WSG coordination

6 PROJECT MOBILISATION TO DATE

The project start up and mobilization has to some extent been effected by the slightly confusing effective start-up date for the project. The contract between MRRD and Norplan was signed 25th of November with an effective date of 5th of December 2011. However, the mentioned contract has to be approved or endorsed by NORAD after signing since this agreement was covered by another bilateral agreement between NORAD and MRRD. Although this contract was initially signed in 2009, changes to the situation required addendums to the agreement to be made. Thus, NORPLAN was not in the position to mobilise or plan mobilization from the 5th of December. However, NORAD issued a memorandum so that the leader could make a preparatory visit in December 2011 in order to push the earliest start-up of the project.

Thus the activities taken place has been as follows:¨

December 2011:

25th November 2011: Contract between MRRD and NORPLAN signed

6th December 2011: Norplan team leader make the first visit to Kabul to prepare for the inception start-up.

8th December 2011: Norplan submits letter to MRRD requesting NOK 1 mill advance for procurement project equipment and transport as described in the TOR and as covered in the MRRD/ Norplan contract.

During that visit the following took place:

- Meeting with Him. Minister in MRRD to signal the project start-up
- Meeting with Deputy Minister, MRRD
- Meeting with DACAAR to prepare for the formulating the sub-contract between Norplan and DACAAR as defined in the TOR.
- Team leader had meeting with the Royal Norwegian Embassy for the following reasons:
  - To inform the Embassy about the imminent start up of the project.
  - To receive a security briefing and security advise how to bring international project staff to Kabul for project implementation
- Team leader met and agreed with local staff to join the project as soon as Norplan has received the approval that the project was approved for start.
- Team leader visited and located suitable accommodation for housing international staff in secure accommodation once mobilized.
- Team leader held meetings with Norwegian Afghanistan Committee (NAC) and Norwegian Church Aid (NCA) to receive security updates for running operations in Afghanistan.
- Team leader agreed with DACAAR to provide security support framework for Norplan project staff while in Kabul.

January 2012:

6th January 2012: While still awaiting confirmation that NORPLAN could fully start up the project, Norplan after consultation with MRRD took the initiative to mobilise all international experts for a project brief at Sandvika, Oslo, NORAD attended the meeting with two persons. It was important to hold the meeting if the project were to follow the tentative timetable as outlined in the contract.

10th January 2012: Norplan's deputy team leader, Naqubullah Abrar, is engaged and starts full time to make preparations for project start up in Kabul. MRRD finds temporary office accommodation for him in MRRD.

10th January 2012: Norplan received signed contract with signed addendums for MRRD/ Norplan contract which was they sent to NORAD for approval (approval of addendums)

15th January 2012: Prof. M Hamid, joins the Norplan project as the National training expert.

20th January Project team prepare visa application. Change to digitalized handling of applications increased the handling time from 3 to 10 days This caused much extra concern and time.

February 2012:

29th January 2012: till 13th February: Team leader leads team to Kabul as the first of international staff to start field work for inception planning period. The rest of the team arrived as follows:

Name	Expertise in team	Arrived Kabul	left Kabul
Dr. S. Stoveland	Team leader	30th Jan	13th Feb
D. Banks	Chief Hydrogeologist	3rd Feb	13th Feb

G. K. Grepstad	Hydrogeologist	3rd Feb	9th Feb
T.G. Overli	MIS/ GIS expert	3rd Feb	9th Feb
A. Norbo	Training expert	3rd Feb	13th Feb
R. Ghafuri	Hydrogeologist/GIS expert	6th Feb	13th Feb

2nd February 2012: Agreement between Norplan and DACAAR agreed and document signed during visit to 11th February.

3rd February 2012: Norplan receives communication via email form the tender agent that Norplan has been awarded the contract with MRRD.

5 and 6th Feb: Team meet MRRD, DACAAR,

Team meeting MRRD director, Ghulam Qader.

Hon. Minister Mansoori and Acting Norwegian . Ambassador G. Lochen at inception workshop

7th-8th February 2012: Inception workshop with 45- 50 participants

22nd February 2012: Local office furnished and occupied in RuWatSIP department in MRRD.

March 2012:

8th March: Meeting with Erik Toft, Consultant to the World Bank, for understanding how HGS project links into the World Bank/ARTF proposed rural water supply and sanitation project..

6.1 Inception workshop I MRRD, Kabul.

An inception workshop was implemented as planned during the first gathering of international staff in Kabul at the beginning of February. The purpose was to present the project to key sector stakeholders in Kabul in government , with NGOs and training institutions so they were aware about the project. At the same time, key resource personnel were present to discuss the TOR and activities in the project and how this could best be implemented. The first day was used for the official opening of the project with the Honorable Minister for MRRD and the Act, Ambassador from Norway wre present. It was a good project opening with focus of this as an important project for MRRD and Afghanistan. The Norwegian Ambassador said that the project has taken some time to be developed, but now they were please and happy that the project had started. The rest of the day was used for the presentation of the project framework like water law, national policies and roles and responsibilities of different actors in the sector. MRRD highlighted the key elements in the TOR and their expectations. Likewise a delegation headed by the MRRD provincial director from Faryab presented the provincial status and project expectation.

The second day was use by Norplan to present their understanding of the key project elements and invited the more than 40 key sector participants to break in to groups and give the consultant advise on status and important considerations to be taken along when developing the project covering:

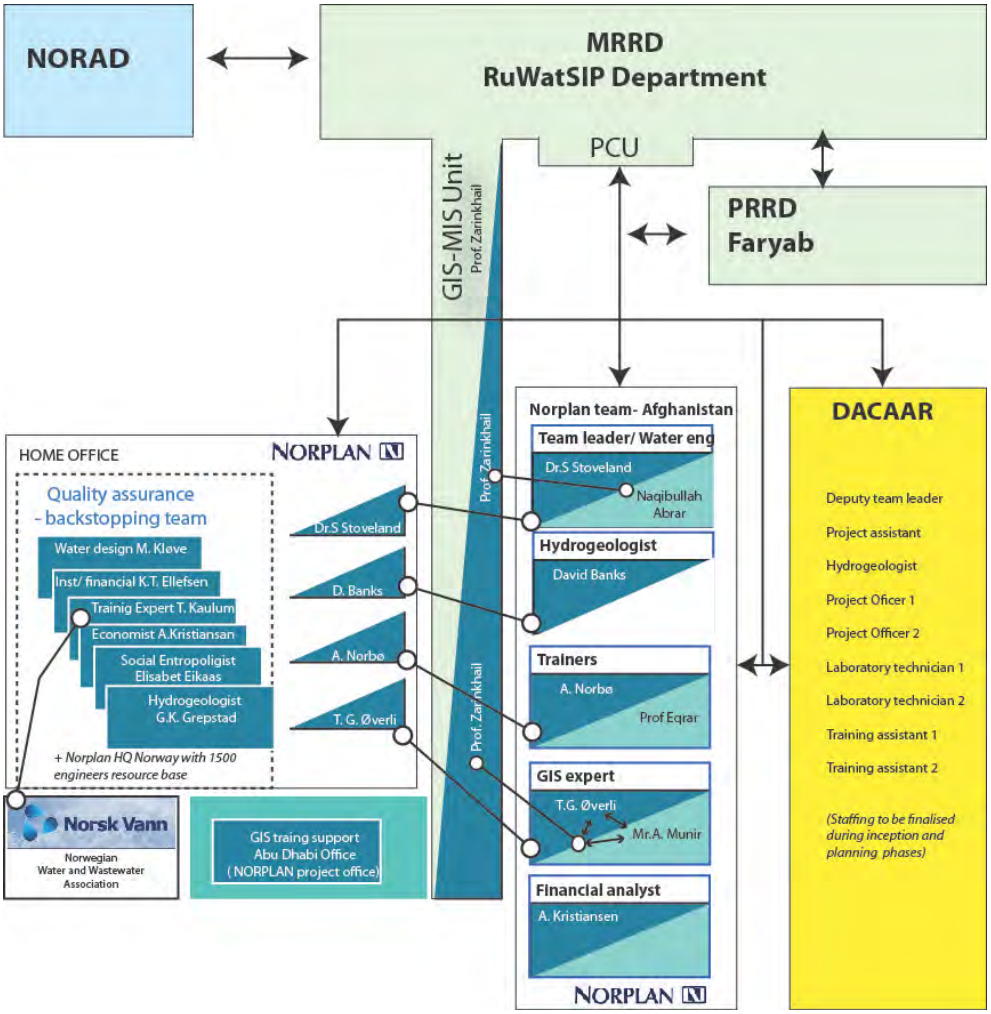
1. Hydrogeological survey and studies
2. GIS and MIS for hydrogeological data and water resource information
3. Training needs and training capacities
4. Situation in Faryab and project impact.

Please see in the appendix the report from the inception workshop. The recommendations discussed has been taken included the development of the program for the planning phase of the project.

7 PROJECT MANAGEMENT,

7.1 Norplan Kabul

For the project implementation, Norplan is organizing key resource personnel as proposed in the project proposal and shown in the figure below.



The project organization diagram has been modified to include the special support to the GIS-MIS unit as requested by MRD and agreed to by NORAD. Though the fortunate recruitment of Prof. Zarinkhail, it is believed that the unit can be developed to be a strong resource centre as well as a key water and sanitation sector information hub for sector development. to resolve this just by internal training.

It has become evident that in order to manage the logistics for the project office staff and office support is required. The local office will be organized as follows:

Technical personnel

- Deputy team leader/Office manager, Eng. N. Abrar
- National training expert, Prof. N. Eqrar
- GIS-MIS expert, A. Munir
- National GIS / MIS officer Prof. S. Zarankhail

Project support personnel:

- Administration and finance officer, (recruitment completed, Ramzia Yosoufi)
- Messenger/office support: to be recruited (changed to logistics officer, see below)
- 3 Drivers: (to be recruited/engaged when vehicles are procured)

7.2 Modifications in Norplan staffing

Gis expert:

At the professional level some changes have been necessary. The first change is that our senior GIS expert, Tor Gunnar Øverli, finds it very difficult to visit Kabul for job assignment giving demanding security situation. We therefore have will propose to use Frank Haugan who is willing to travel to Kabul for necessary assignments for continue the work. Frank Haugan and Tor Gunnar Øverli works in the same technical departments in Norplan. Frank Haugan is a well qualified expert who has worked for longer periods abroad and also in Palestine. He has also experience with working with Hydrogeologists on GIS mapping. (see CV attached)

Tor Gunnar Øverli will remain as strategic adviser to the project and to Frank Haugan.

Local GIS support.

Norplan has found it necessary to find a replacement for Reza Ghafouri. The reason is that Gharouri had difficulties in communicating well in English with the international staff. An able and qualified local expert has been identified who will be presented to the client before starting the planning phase. Fortunately, a graduate GIS expert I available in MRRD who can provide counterpart support to the project and to assure that the GIS is updated and linked well into the MRRD MIS system.

Revised local requirements for GIS support to the project and RuWatSIP

During the planning period, it became clear that RuWatSIP has problems in guiding the developmentof the GIS and MIS activities in the department. This became particularly clear as three consultants (from

UNICEF, WASH Cluster, USAID and NORPLAN,) handling GIS-MIS proposals and projects were working with RuWatSIP and looking for guidance and coordination how to develop a suitable institutional arrangement in the department and how to coordinate the different databases and programs in such a manner that they would be compatible and complementary to each other. For such a coordinating role, an expert would be needed in RuWatSIP in a regular, full time basis and the person would need to have expertise and training to handle such complicated systems. So in June it was agreed in a meeting with the director in RuWatSIP that all projects needed coordination and the department did not have qualified personnel to handle such a demanding assignment. It was then agreed that NORPLAN would draft a job description for a GIS-MIS technical adviser for funding under the NORAD financial support. The GIS/MIS technical adviser should be reporting to the director in RuWatSIP on technical matters but to the Deputy Team leader in Norplan of contractual issues. The GIS/MIS technical adviser should facilitate the establishment of an operational GIS/MIS unit to handle the information demands in the department. As part of this work the GIS technical adviser should fulfil the work demand for GIS support on the NORAD supported project spending perhaps about 50% of the time on this project while supporting other UNICEF and WASH cluster activities as prioritised under RuWatSIP.

With the job description developed, and recruitment process was undertaken, advertising the position appropriately and having a 6 member interviewing team and a technical test to select the best candidate. With the No objection from NORAD, Norplan has proceeded to contract Professor Zarinkhail to the position as GIS technical adviser starting from 10th of December 2012. This recruitment is needless to say a great relief for all and the work do institutionalise the GIS/MIS development in RuWatSIP can now proceed.

Under this activity the GIS technical adviser will be supported with procurement of hardware and software needed. This will of cause also be of value for complementary projects in the department.

The cost for this position in included in the revised report. See Job Description in appendix.

Logistics support officer

As car are ordered and activities are increasing, one officer is needed to handle the management of the logistics for visitors, transport and all activities to be organised in/ out of the office and within the project venues. The person will also be organising the collection and deliveries as of people and items as needed. It is proposed that the officer should start at the beginning on of the planning period and the person would be needed certainly for the first 12 months with possible extension till the end of the project. The above officer is linked to the office activities.

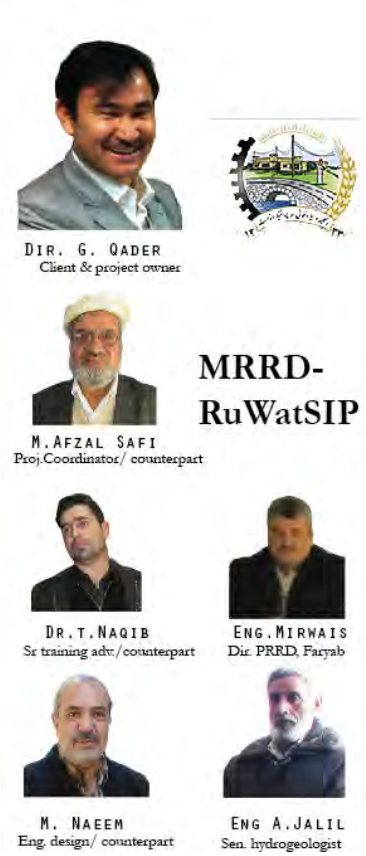
Training programme logistics support.

As the training programme is about to start, it has become increasingly clear that project administration takes time and require support. This includes printing of documents, checking rooms for training, organise furniture, handling lunches, organising stationeries, paying travelling allowances for participants etc. This officer will be needed for at least 12 months and ready when the courses start. He will have to work closely with Prof. Eqrar facilitating training logistics. This has been discussed in RuWatSIP and announcement for recruitment is planned to start very shortly. Have been waiting till the contract challenges with tax had been resolved. Hope to have a person I position by late January in good time for the start of the training activities.

Receptionist:

The Norplan office in the RuWatSIP building is located at the ground floor and is one larger room. There is a need to have one person responsible to record visitors and enquiries and to ensure that the office files and equipment are kept safe. . The person will be located at the entrance of the room.

7.3 Working with MRRD and counterpart staff.



The project office is located within MRRD. This makes communication and coordination easy. The project office has been allocation, renovated and basic furniture provided so that Norplan staff have their own office in the RuWatSIP building.. The other key counterpart staff in the department is near by. This makes is easier for good coordination.

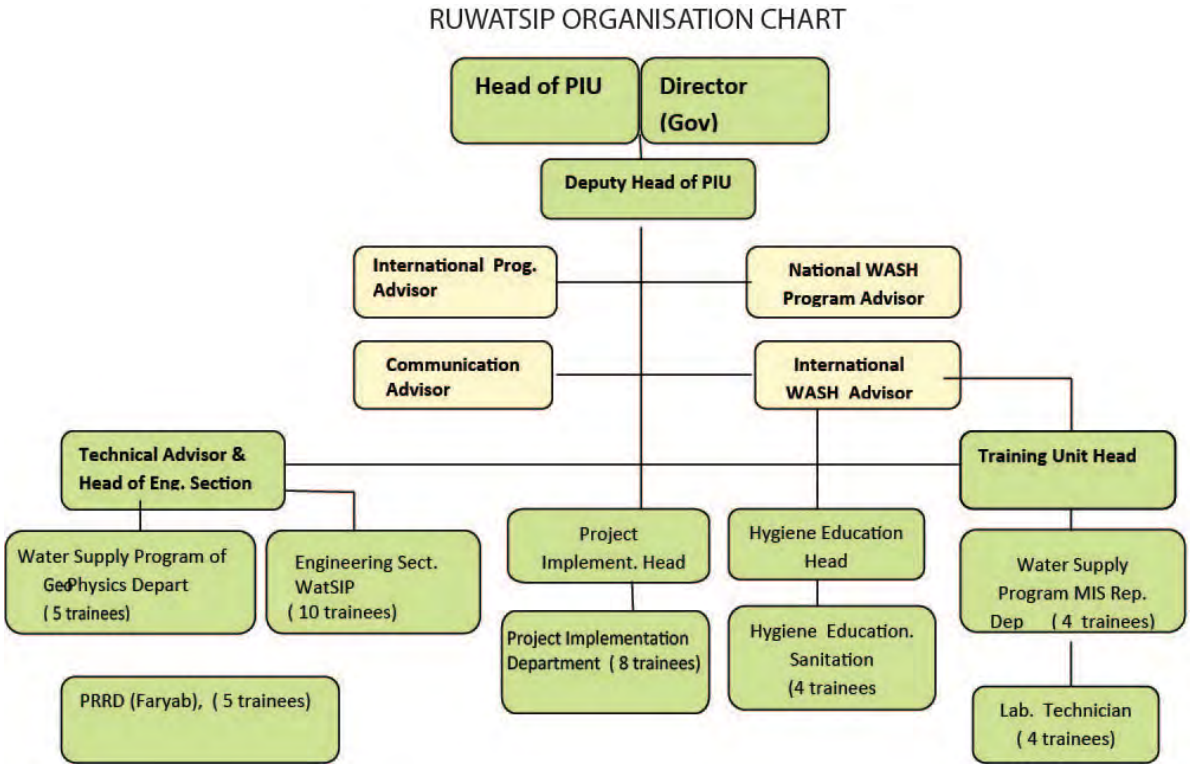
In the RuWatSIP department there the key resource people who are members of the PCU are knowledgeable, well informed and great counterparts for the project. But like always, key staff are always loaded with assignments and therefore they are very busy with other sector activities. This underlines the importance for MRRD to have its capacity developed and extended as other project may also start.

UNICEF is provided financial support to MRRD for advisers so as to provide both expertise and capacity for handling the sector assignments which RuWatSIP is tasked to undertake. This is a know situation whereby government agencies have both government staff as well as project advisers on contract. Although this is not desirable as such, this staffing situation can be expected to exist for quite some years to come and this project has to acknowledge this situation. Norplan has already been in contact other agencies like USAID, KFW, GIZ, EU: JICA and World Bank for discussion of how best to provide assistance with capacity building in Government institutions where there are both permanent staff and contracted staff on quite different terms. Norplan will continue to participate in this discussion but keep in mind that we have to focus on both short and longer terms solutions when discussing sustainability issues and capacity building. A broader view is needed and links to shorter and longer tem training and capacity building would be needed. It is also envisaged that in order to expose more permanent staff to international expertise, language courses should also be covered under this project for senior staff.

The project team leader when in HQ in Norway is virtually in daily contact with the deputy team leader in Kabul discussing project issues on skype. On weekly basis, all key resource staff in Norplan have been attending progress meetings on skype discussing planning issues. This methods of communication works well in terms of following up the project and by providing support and advise to Kabul from and to local staff who again liaise with MRRD on a regular bases.

We hope to extend the weekly project meetings to include senior RuWatSIP staff in the planning phase.

The department is planning for expanding the capacity within the department and from the organization chart below it can be seen that RuWatSIP has 36 trainees in the department. During the planning phase, the candidates for training from the department will be organized.



7.4 Working with DACAAR

The project has already established good contact with DACAAR. A number of meetings have been held for the purpose of preparing an agreement which basically followed the work plans as outlined in the TOR and the unit rates for project staff as DACAAR had previously provided to NORAD prior to the start up of the project. The costs of the services provided by DACAAR will thus be provided based in staff resource time provided and cost of reimbursable expenses. This makes work flexible and it will be possible to make adjustments as work is progressing.

From Dacaar, the staff directly involved in the project will be key personnel such as:

Head of Programs:	Shah Wali
Wash Adviser:	Leendert Vijselaar
Hydrogeo/GIS:	A. Jawid
Sen. Hydrogeologist:	M. Hassan
Dep. WETC training:	Dr. Shir Ahmad

NORPLAN

Dep. Operations	P. Bismullah
Security officer	A. Faisal

The above mentioned staff is well acquainted with the TOR and the work at hand. All contractual issues and strategies will be handled and channelled to the head of programs, Shah Wali. The wash adviser, Leendert Vijselaar will be a key general technical contact person for discussion of project organization, policy and WSG issues including strategic planning of water supplies in towns. For the development of the GIS system under the project and how this will be linked into the DACAAR database with 40000 records Jawid is a key person to organise and guide the project. There will have also been need for much training both for professionals and technicians as well as for field staff. Shir Ahmad will be a key contact person to guide the training resources and training development resources from DACAAR to the project. Bismullah is a very valuable resource person since he has been working and leading the DACAAR project office in Maymane in Faryab for 5 years. His guidance for surveys, resource persons and sector overview in Faryab is valuable and important for effective project implementation there.

The last person which also need specifically mentioning is the Dacaar security officer A. Faisal. He has already provide security briefing to project staff as well as continued updated security advise on SMS and email white in Kabul. This service is valuable to project staff and project implementation.

Chapter 9 below describes more detailed the input to be handled by DACAAR.

7.5 Specialist support personnel:

Highly qualified hydrogeoloigst for short term course(s)

Hydrogeology is a much specialised field. During the inception workshop it was requested that emphasis should be given to specialist training in interpretation of data from the hydrogeological investigations. Thus, this will be planned for and international expert will be identified to cover the specialist subjects required.

Institutional cooperation with Norsk Vann for training support.

Norsk Vann has training expertise for water and wastewater operators in Norway. Furthermore, one of the key trainers, Trond Kaulum, has previously involved in training of water supply operators in Kabul (CAWSS) where he assisted in developing training programmes, design and production of training material for the organization. Involving Norsk Vann here can assist to guide trainers how to plan their work better.

Procurement expertise

As part of the procurement it is clear that support is required from HQ to assure that procedures are in line with procedures and practices as required by NORAD and international auditors. Norplan is in the main following an accounting system as applied for previous NORAD funded projects in the Balcans where Norplan had management responsibilities.

8 THE WAY FORWARD. PROJECT CONCEPT.

In the next planning phase, the planning will start properly with the different technical staff focussing on the different components. Although the project have emphasis on hydrogeology and capacity building around surveys of water resources, there are a multiple of activities to be handled. Therefore the diagram has indicated outlined the different sub- projects to be covered.

The inception period has mapped out the general status and most of the activities to be done. However, with the inception coinciding with the winter months, it was not possible to visit Faryab with the international staff to discuss the project in detail. However, a 5 man team from Faryab attended the inception workshop in Kabul and that was good. We will expect to hold a workshop at the beginning of the planning period in Maymane and we have to prepare us so we can answer the provincial concern of what resources will be available for developing water supply services in the province. The consultant need some good advice how best to address this issue.

The many activities covering hydrogeology will start with data collection, surveying, water and soil analysis and planning a pilot project. First in the planning phase will it be apparent to what extent different techniques needs to be employed or to what extend additional test drilling boreholes need to be sunk.

For training activities, we have a general framework for courses to be addressed as discussed during the inception workshop and later. Early in the planning phase, a training plan will be prepared and discussed with the key stakeholders before a firm training program can be presented. It has not been possible to do a more detailed plan at this stage.

The work with the GIS and information management framework so well at hand and the tasks are to gather information how best to structure the design so it fits the existing systems.

Project Web- page.

Early in the planning phase, a project web page will be designed and launched for best possible information exchange of what the project hope to achieve and as we are progressing, achievements will be presented. It is hoped that this will help other programs to make use of the information and methodologies developed for the common good of the water sector in Afghanistan.

It has also been demonstrated that there are many activities which project staff needs to participate in such as WSG meetings, activities and workshops for other related rural and urban projects for the purpose of leaning faster and avoid repeating old mistakes.

This project will also as part of its focus on preparing plans for three towns in Faryab province, also test the developed operation and maintenance system which the WSG and UNICEF hope will render rural water supply interventions sustainable. The project will also try to join forces with other parallel projects with aims to register all water supply assets for a national inventory database. It could be possible that there would be much to gain by developing joint infrastructure and training facilities for the related activities.

It has also been noted that project staff have to fully acknowledge the security situation since this affects the travels particularly of international staff. However, good experience have been gained by using skype, talking regularly with all project personnel from Kabul and other places. This routine will continue.

We hope that a visit can be arranged for MRRD staff to visit Norway, Norplan and Norsk Vann to work out the more detailed framework for institutional cooperation within training and for providing external support for sustaining the GIS, web and information management system at RuWatSIP.

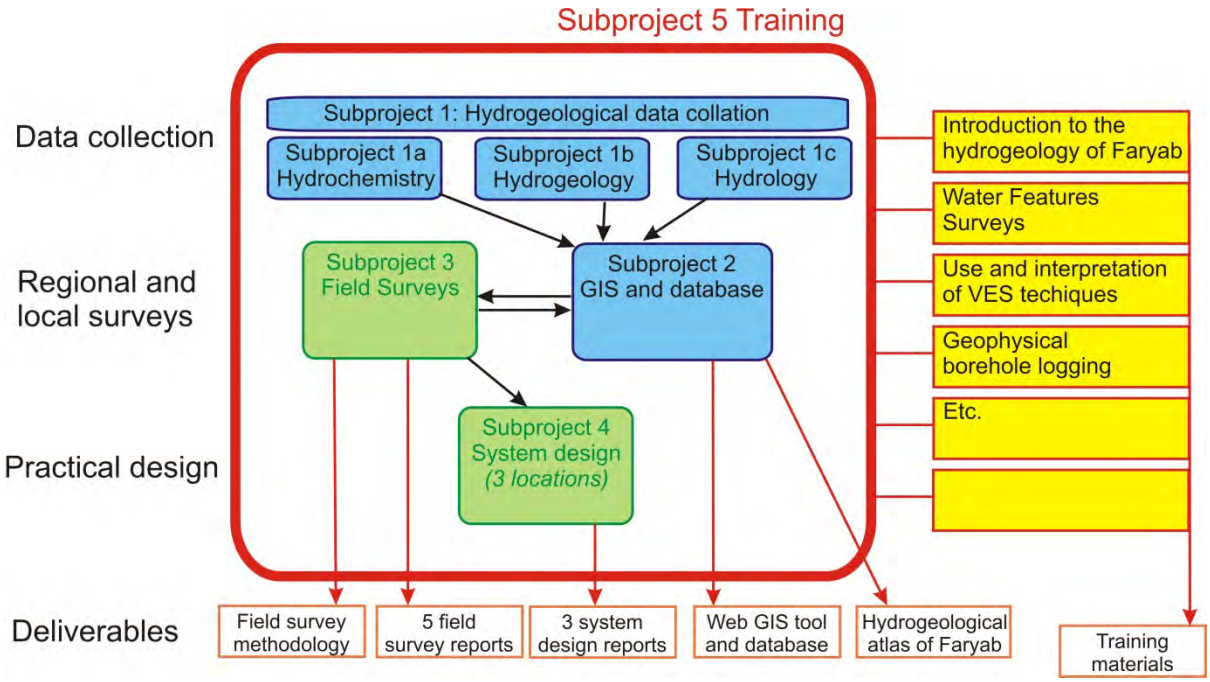


Figure 8.1. Schematic diagram showing proposed components and subproject structure for NORPLAN-MRRD project.

8.1 Subproject 1: Hydro-geological data collation

In the planning phase, three subproject teams will be formed:

Subproject Team 1a (suggested to be led by Eng. M Hassan Safi) will be charged with compiling all available hydrochemical data on (a) precipitation, (b) soils, (c) river waters, (d) groundwater. Data from well over 1000 groundwater sources in Faryab is believed to be currently available in DACAAR's databases. It is envisaged that the bulk of this data will be collated during the Planning Phase, towards the end of which it will be passed to the GIS team (Subproject 2) for incorporation into the GIS tools.

The main source of hydrochemical data will be DACAAR, supplemented by information from NCA, MRRD, UNICEF and other NGOs active in Faryab.

During the Implementation Phase of the project, Team 1a will continue to work on collating incoming data from the Field Surveys. Arrangements will be made to collect samples of precipitation and soils from Faryab for chemical analysis. The team will carry out modelling of hydrochemical evolutionary pathways with the objective of clarifying the origins of salinity in the groundwater in the northern portions of Faryab Province.

Towards the end of the project, the team will prepare a paper on the topic of the evolution and distribution of hydrogeochemistry in the Shirin Tagab Province for publication in an internationally peer-reviewed journal and for presentation at the 2014 Annual Congress of the International Association of Hydrogeologists (IAH).

Subproject Team 1b (suggested to be led Eng. Ehsanullah Bayat) will be charged with preparing a hydrogeological conceptual model of the Province by (a) designating existing units on the geological maps of the province in various aquifer or aquitard classes, (b) compiling existing information on groundwater levels, yields, well locations and depths, borehole logs, pumping tests etc. and (c) compiling one or more hydrogeological cross-sections of the Province. During the Implementation Phase of the project, the Team 1b will continue to work on collating incoming data from the Field Surveys and on constructing a conceptual model the Shirin Tagab catchment and northern plains aquifer system.

The main sources of hydrogeological data will be DACAAR (existing database) and MRRD (Engs. Safi and Jalil will be requested to recover all drilling records for boreholes drilled in Faryab, either from their own archives or from data handed over to UNICEF), supplemented by information from NCA, ARD, UNICEF and other NGOs active in Faryab.

Subproject Team 1c (suggested to be led by Prof. M H Hamid) will be charged with compiling all available hydrological data on (a) meteorology, rainfall and potential evapotranspiration, (b) river flows and (c) water usage for irrigation and public supply in Faryab Province. It is envisaged that the bulk of this data will be collected during the Planning Phase, towards the end of which it will be passed to the GIS team (Subproject 2) for incorporation in the GIS tools.

During the Implementation Phase of the project, the Team 1c will continue to work on constructing a water balance for the Shirin Tagab catchment and northern plains aquifer system, in the hope of beginning to quantify the ultimate fate of the Shirin Tagab's flow and to begin to quantify recharge to the Neogene / Quaternary aquifers systems.

Towards the end of the project, the Teams 1b and 1c will prepare a paper on the topic of the hydrogeology and water balance of the Shirin Tagab catchment for publication in an Internationally Peer-reviewed journal and for presentation at the Annual Congress of the International Association of Hydrogeologists (IAH).

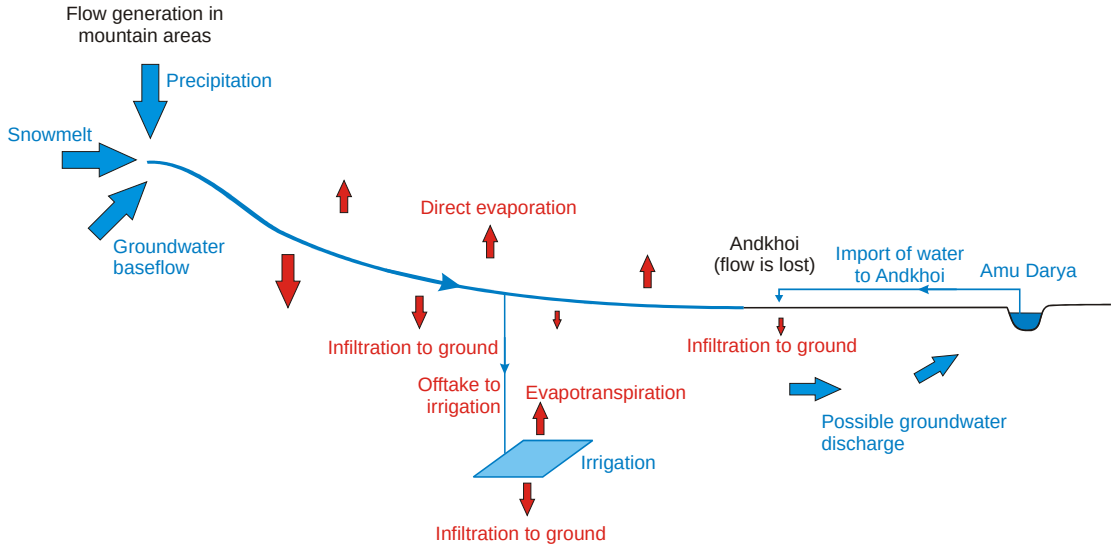
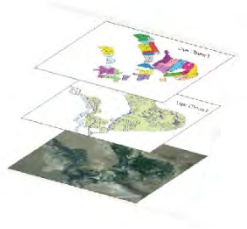


Figure 8.2. Possible elements of the water budget of the Shirin Tagab catchment.



8.2 GIS

Information technology represents an important tool and possible repository of information required for hydrogeological analyses and design.

A geographical information system manages and handles the spatial aspect data, simplified GIS can be perceived as an extended MIS / information system.

The inception phase in relation to GIS / MIS has focused on getting an overview of existing data, systems, resources and competence. Furthermore, the defined needs in the TOR as well needs identified through the inception phase have been assessed. This forms the foundation for the recommended components and data structures to be designed and planned for in the next phase of the project.

This chapter is based on;

- The Terms of Reference for the current project
- Information received from key resources in MRRD
- Information received via the inception seminar
- Information provided by resources from the NGO Daccar
- Information available via internet
- Experience and general knowledge

8.2.1 Existing status and on-going initiatives

MRRD and its departments are mainly operating projects, funded by different donors. Their central GIS / MIS is supporting this, enabling management and others to monitor and get statistics related to project status, content and other indicators.

The MRRD MIS is fed by information from the various departments in different forms, e.g. from RuWatSIP in the form of excel files. The information from RuWatSIP is provided from the UNICEF project office. There are ongoing initiatives to improve this work process and a project is about to be tendered, funded by UNICEF.

Project/Program Title: Institutional Strengthening, policy development and advocacy

Annual Work-Plan number: 1.16 **Support establishment of functioning computerized GIS /MIS data base on WASH facilities and the relate parameters**

"strengthening the existing MIS in the RuWatSID by creating a unified database of all the existing programmes and projects in the sector"

The two main features of the planned system are projects and assets (e.g. wells, waterpoints, etc).

The existing MRRD GIS is an ArcGIS based tool, mainly for presenting and visualizing project status and statistics from the MRRD MIS on maps, using administrative boundaries as information carrier (e.g. status on province or district).

The Afghanistan Office for Geodesy and Cartography is responsible for managing and distributing spatial data in Afghanistan. It is understood that there are a large amount of general spatial data available (e.g. topographic data, administrative boundaries, etc), however, the policies or practice of disseminating the data is not clear. Access to spatial data is hence in general based on informal copying and sharing between ministries, NGOs and other entities

Different **datasets** that are being shared on more informal bases that were mentioned as relevant are;

- AIMS – Afghanistan Information Management Services – a dataset from 2004
- USAID project dataset – includes administrative boundaries from 2009
- Geological data from Institute of Geology/Afghanistan Geological Survey (AGS)??
- ACSP – Afghanistan Country Sustainability Program – with data from 2010 from different sources, including ISAF, the office for geodesy and cartography and aerial imagery.

A DVD distributed by USGS, funded by USAID, from 2007 has a comprehensive and well organized structure of spatial data for whole Afghanistan. The data can be used up to scale 1:250.000. The DVD includes industrial and metallic mineral resource assessment tracts, geologic, structural, geochemical, geophysical, environmental, political, and other geospatial datasets covering Afghanistan.

The NGO DACAAR is using GIS / MIS actively for planning and managing their activities and assets, including water supply. The following relevant systems / data have been identified;

- HydroGeoAnalyst – a software package by Schlumberger for analytical purposes, utilizing, visualising and correlating geo-environmental data
- Aquachem – a further software package, allowing the databasing and graphical presentation of water chemical analyses.
- A Ground Water Monitoring database – monitoring water level and other parameters for 17 wells in Faryab
- A Water Point Information System – for asset management of water points, including wells.
- ArcGIS 10 desktop GIS – for producing thematic maps

The GIS mainly in use in Afghanistan is **ESR**I based – ArcGIS 9 or ArcGIS 10. Data is being shared as shapefiles or as ESRI geodatabase.

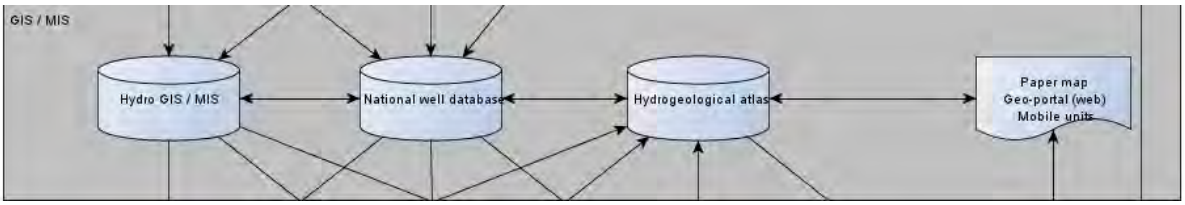
At **Kabul University**, students are taught in geodesy and cartography, however, practical teaching in GIS seems to be lacking in Afghanistan.

At Kabul Polytechnic some GIS competence is reported to be available in the Geology Department, with two academic staff recently having taken MSc degrees in GIS-related topics at Brighton University, UK.

The available network infrastructure for government is based on existing physical cabling and is regarded as weak and unreliable. A fiber - cabling project is underway but it is unknown when it will be available. Various commercial providers offers mobile based high speed network.

8.2.2 Planned GIS / MIS in the project

To meet the identified needs and the expectations of the project, the following main components of the GIS / MIS are planned under the current project.



a) A "traditional" GIS / MIS for managing and analyzing spatial data related to hydrogeology
b) A "well database" – with relevant common information about wells, springs, boreholes and other groundwater features.
c) A "hydrogeological atlas" – a simple and user friendly way of assessing possibilities for ground water

a) A comprehensive **GIS / MIS for managing hydro- and geological data,** including field survey data. The tool shall include necessary topological and imagery data, supporting planning, analyses and presentation of hydrogeological conditions.

There exists a broad range of possible technical platforms for this GIS. However, as MRRD already is using ArcGIS, we recommend this tool to be used.

For ArcGIS, an extension called ArcGIS Spatial Analyst is relevant;

> ArcGIS Spatial Analyst contains specialized tools for working with and deriving new information from hydrologic and landscape data.
>
> Its toolset includes methods for describing hydrologic characteristics and tools to calculate flow across an elevation surface, calculate flow path length, and assign stream orders. These kinds of derived data are often used to aggregate landscape information for input to hydrologic models.
>
> The groundwater tools can be used to perform simple 2D advection-dispersion modelling of groundwater flow and constituents in groundwater. The Darcy Flow tool generates a groundwater flow field from hydrogeological data. The Particle Track tool follows the path of advection (movement) through the flow field from a point source, and the Porous Puff tool calculates the dispersion of a chemical or constituent as it is moved along the flow path.
>
> www.esri.com

Data from the USGS DVD from 2007 is a good foundation for the GIS / MIS in MRRD. It should be extended with borehole / well information, updated topological data and possible better imagery.

Relevant activities / investments;

- Purchase ArcGIS 10 license, including HW and Spatial Analyst extension. It is assumed one license is sufficient. Subject to further clarification during planning phase.
- Structuring existing data and collecting data from other sources that is relevant.
- Training and staffing

b) A well / borehole database (in this project limited to Faryab region). The database shall include information about each borehole / well, including its location, status, water depth and other relevant information. Providers of data will be various NGOs, MRRD or other entities drilling for water. A data collection activity should take place during this project to ensure the database is up to date. It shall be noted that the well / borehole database should not be an asset management system. If so is needed, it shall be provided by the entities owning or operating the wells.

The activity needs to be coordinated with the UNICEF tender for establishment of a functioning computerized GIS /MIS data base on WASH facilities and the relate parameters. We do see at the current stage a degree of overlap in respect of this task.

The technical implementation of the database and its interface can be based on open web services and components, e.g. PostgreSQL / PostGIS and MapServer. For the planning phase, Norplan's infrastructure Adaptive is planned utilized.

Registration and maintenance of data is planned undertaken by;

a) Web forms – available for authorized people in the field or from office with net-access. A form for smart-phones will be assessed, enabling direct registration in field.
b) Paper forms for personnel in field – to be sent for post-registration in database centrally

Relevant activities / investments;

- Design and implement database, forms and web interface
- Establish database using existing data (MRRD / DACCAR / others)
- Connect database with the GIS / MIS
- Define procedures for data registration and maintenance
- Training of field staff
- Do registration and quality check work in Faryab

c) A hydrogeological / water atlas. The purpose of the atlas is to support personnel without hydrogeological competence in their work for finding water. Typically it will be used by field workers from the local government or from NGOs. In theory it can also be used by local rural people.

The atlas should use cartographic elements and the results from field surveys and hydrogeological analyses to present likelihood of water and possible water quality on maps, easy for interpretation and understanding. A "guideline" in finding water, handling and designing infrastructure and maintenance might be included.

The main interface of the atlas will be as a paper product. This is the only functioning format for field work currently in Afghanistan.

However, to ensure the availability and access to the atlas, open digital versions are a required. The atlas should be available via web both as a PDF document but also as a geo-portal / web-map solution, e.g. using Google Earth as medium.

A mobile version might also be assessed, to be used by smart-phones. This may have a more simplified user interface, e.g. using colour symbols to visualize the likelihood of finding good water at any position (using the GPS of the smartphone).

The atlas should be «living» product, always utilizing updated and new information to make the atlas more accurate and reliable.

Relevant activities / investments;

- Develop methodology and design of atlas – possible involvement from academia
- Collect data required for the atlas
- Design and produce atlas
- Distribute atlas
- Train in use of atlas
- Develop and train in methodology for maintaining atlas
- Design and publish web portal for atlas, including web-map solution

8.2.3 Plan for next phase (GIS/MIS)

For the planning phase, design and implementation of the components given above will be in focus.

The following activities have been identified above and are further elaborated / assessed in the table below;

Activity	Priority	Resource(s)	Cost / volume
Establish GIS / MIS	**1**		
Purchase and install ArcGIS 10 license, including HW and Spatial Analyst extension. *Software and hardware cost*	1	NP int. exp NP local SW / HW	8 hr 40 hr
Structuring existing data and collecting data from other sources that is relevant.	2	NP int. exp NP local	8 hr 80 hr
Training and staffing *Training related to purchased software to be provided by vendor*	3	NP int. exp NP local Ext. trainer	24 hr 80 hr 120 hr
Establishing well / borehole database	**1**		
Design and implement database, forms and web interface. The proposed solution is based on Norplan's infrastructure and products. *Adaptive geo-portal solution*	1	NP int. dev NP local SW / HW	80 hr 40 hr
Establish database using existing data (MRRD / DACCAR / others), including activities such as importing,	2	NP int. exp NP local	24 hr 80 hr

modification, investigation			
Connect database with the GIS / MIS	3	NP int. exp NP local	8 hr 20 hr
Define procedures for data registration and maintenance	4	NP int. exp NP local	8 hr 20 hr
Training of field staff	4	NP int. exp NP local	16 hr 160 hr
Do registration and quality check work in Faryab	4	NP int. exp NP local / DACCAR	16 hr 160 hr
Establish hydrogeological / water atlas	**2**		
Develop methodology and design of atlas – possible involvement from academia	1	NP int. exp NP local	80 hr 40 hr
Collect data required for the atlas	1	NP int. exp NP local	60 hr 200 hr
Design and produce atlas	2	NP int. exp NP local	160 hr 100 hr
Distribute atlas	3	DACCAR	80 hr
Training in use of atlas	3	NP local / DACCAR	160 hr
Develop and train in methodology for maintaining atlas	4	NP int. exp NP local / DACCAR	16 hr 80 hr
Design and publish web portal for atlas, including web-map solution. Suggest utilising same infrastructure as for the well database / portal.	5	NP int. dev NP local	80 hr 40 hr

NP int. exp = International expert from Norplan

NP local = National expert engaged by Norplan in Afghanistan

NP ind. dev = International system developer from Norplan

8.3 Hydrogeological field surveys

Two types of hydrogeological field survey will be initiated:

a) Regional field surveys - of four sub-types

(i) Precipitation hydrochemistry survey: to be initiated in the Planning Phase, collection of precipitation via an agreed methodology, in Maimana, Andkhoi and, if possible, in one of the mountainous areas, for analysis in laboratory in Kabul and at NGU, Norway, with very low detection limits. The six samples sent to Norway will also be analysed for oxygen and hydrogen isotopes. Around 6 x duplicate samples (6 analysed in Kabul, 6 at NGU required)

(ii) River salinity profiles along (i) the course of Shirin Tagab River through Shirin Tagab and Dowlatabad Districts, and (ii) the course of Maimana River from Maimana city through Shirin Tagab district, to provide a photographic record of flows and a linear series of EC measurements and water samples for analysis in Kabul (c. 16 samples total). To be initiated in summer 2012 during Planning Phase. Estimated 1 week fieldwork for car and team of two, around 16 samples and 2 QA samples required. 8 samples will also be sent to Norway will also be analysed for oxygen and hydrogen isotopes.

(iii) Soil salinity survey: Collection of soil samples from hand-dug trial pits at up to eight locations on the Neogene and Quaternary areas of northern Faryab, for leaching with distilled

water and analysis in laboratories in Kabul (control analyses at NGU, Norway). Estimated 4 days fieldwork for car and team of two, 16 soil samples (from two depths in each pit) required, plus 16 QA samples = 32 samples total.

(iv) Rapid well and spring survey of areas with hitherto poor coverage. Figure 3.5 shows that information is relatively sparse in the following areas: (i) northern part of Dowlatabad District and southern part of Qaramqol District; (ii) the area in the far north of the Province; (iii) Kohistan District; (iv) Almar District and (v) Bilchiragh District (and (vi) Ghormach District, if currently defined as part of Faryab). In the cases of (iii), (iv) and (v), access is believed to be restricted due to security concerns. In late summer 2012, at the commencement of the implementation phase, or final part of the planning phase, it is planned to deploy two teams, each comprising a car, driver and groundwater engineer, to carry out a rapid survey of groundwater features in underrepresented areas. The teams will either comprise engineers from DACAAR, or may comprise engineers of NCA's partner organisations, with access to the more restricted areas of the Province. At each groundwater feature (well, borehole, spring, karez) the team will record: (i) type of feature, (ii) photograph, (iii) water level, (iv) flow rate (if appropriate), (v) usage, (vi) electrical conductivity and temperature, (vii) GPS location and will take a water sample for analysis at approximately 33% of the sites. Estimated 2 x 4 weeks fieldwork for car and team of two, up to 150 water samples, plus 20 QA samples = 170 samples total. 20 samples will also be sent to Norway will also be analysed for oxygen and hydrogen isotopes.

b) Site specific surveys

During the planning and early implementation phases, up to **five** sites will be selected for more detailed investigation. Three of these sites will be selected on the basis of MRRD's and the Province's prioritisations for water supply (and will be the same sites that will be used for conceptual system design Section 8.4). The other two sites will be selected by hydrogeologists with the aim of elucidating key hydrogeological issues.

The exact nature of the survey at each site will be site-specific and will be clarified during the planning stage. It is expected that each site will be subject to:

- desk study, including remote sensing survey;
- walkover survey and water features survey;
- initial hydrogeological impact assessment;
- geophysical survey;
- exploratory drilling of single borehole; grain size analysis of sediments;
- design of hydraulic testing phase;
- drilling of supplementary boreholes (typically between two and four boreholes at each site, to provide optimal combinations of both pumping and observation wells, wells to Quaternary and Neogene aquifers);
- background monitoring;
- step testing to characterize well yield and efficiency;
- constant rate pumping test to provide aquifer characteristics and to assess water quality evolution (sampling) and sustainability;
- hydrogeological impact assessment;
- ongoing monitoring.

c) Registration of water in unregistered supplies.

As indicated in the TOR, existing water supplies will be registered for map out the availability of ground water resources in the province. DACAAR has already information from the about 1200 water points developed in Faryab and in order to get a complete survey, is it is possible to survey most of the non - registered developed ground water supplies. This should give good information.

DACAAR has good expertise to manage such surveys. Previously, DACAAR used 2 teams for 5 months to survey 5000 water points/ dug wells. In another project, DACAAR surveyed 110 wells over two months in the Kabul Basin. So it should be quite feasible to survey most of the non registered facilities in Faryab which are accessible..

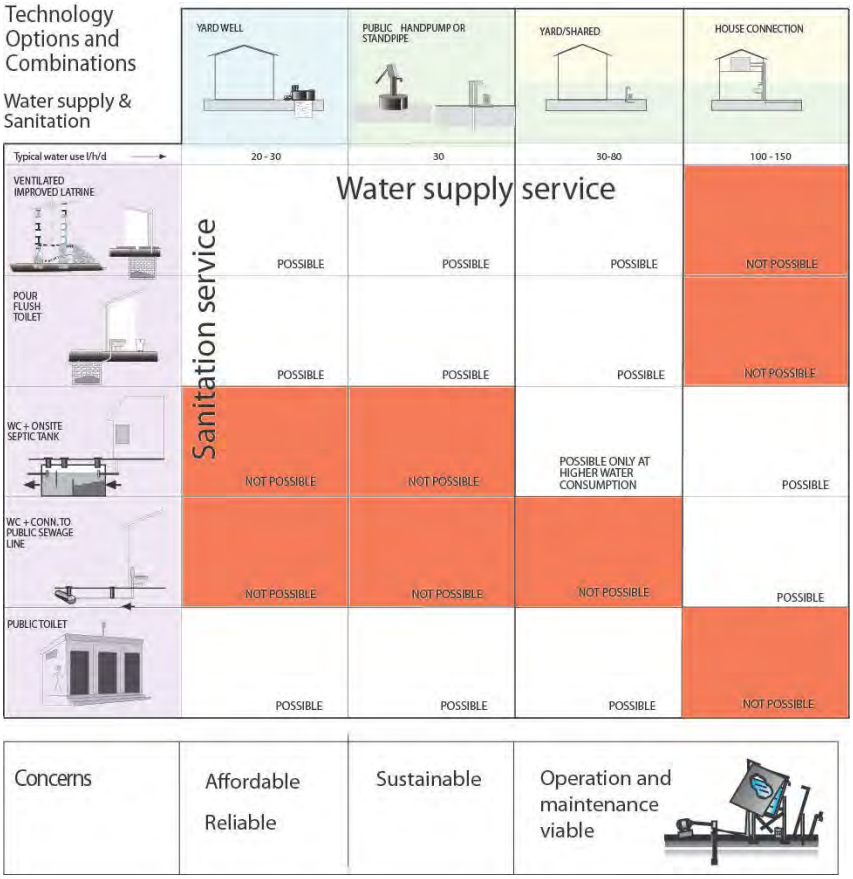
Of cause first the team need to be trained, and the data collection organised and discussed with other programmes in need of similar information for water supply access databases.

8.4 Water and sanitation conceptual design for three towns.

As part of the project, the terms of reference specifies that a conceptual design for water supply and sanitation should be prepared for 3 rural towns in Faryab.

The conceptual design will focus of key issues such as:

- User demand for services
- Service level, minimum and upwards
- Sustainable technology
- Appropriate technology with respect to water quality, water quantity, and affordability
- Operation and maintenance
- Appropriateness based on water resource, water quality and costs



- Affordability and ability to pay
- Compliance with best practices for safe drinking water, sanitation and sustainable O&M services
- Community planning involving all stakeholders

In the case of Faryab, information will be gathered for 3 to 6 candidate towns or areas for conceptual design. The areas will be nominated from project staff based on preliminary surveys and based on provincial prioritization of towns with for highest water supply demand.

The Wash policies will be used as a basis for the conceptual design and for the determination of the user contribution towards capital and operational costs for alternative service levels.

For the different towns, alternative service levels will be assessed and considered for the users and consumers to choose if service level considering water supply, sanitation, hygiene and operation and maintenance.

The table (right) below will be considered as a tool to communicate implication of choice for the different service levels and cost implications for the users.

When preparing the conceptual design, the location of the water supply point and sanitation facilities will be considered and discussed by the communities and even the different family users. Walking distance and appropriateness of location will be discussed.

8.5 Training

8.5.1 Discussion of training issues in the inception workshop

This project is focused on MRRD as the sector leader and relevant organization departments to establish a best practice approach for Hydro-geology, Geo-physic, GIS/MIS , Rural Water Supply Engineers and Technicians to enhance and develop the capacity of hydro-geology projects investigation, mapping, designing of water structures (Shallow wells deep wells, water supply pipe schemes and Rural Water harvesting structures.

Thus capacity development would be conducted as a part of broader capacity building program to enable the relevant departments to implement the hydro-geological investigation, mapping and use the GIS/MIS generally for proper implementation of Water supply projects in best practical level.

The project will attempt to provide guidance on how to better harness technical assistance for effective capacity building and institutional development in hydro-geology sector in MRRD and relevant departments. To this end, it will assess how different types of technical assistance can better contribute to capacity building in this sector. It will then develop a set of recommendations for both donor and the government departments on how to reform and follow up the ongoing capacity building program within practices and policies. In this context, it will explain how common weaknesses could be fixed in capacity building project, (i) recommend integrating technical assistance within institution wide approaches based upon technical training efforts, (ii) highlight the need for better coordination of capacity building activities under improved mechanisms and stronger program leadership, (iii) suggest

setting up nationwide policy instruments and (iv) recommend testing new technical assistance and capacity building approaches.

Training is one of the key elements for making sustainable changes and improvements in the water sector development. This is the one of the parts of the terms of reference for the project. In preparing for how best to respond to this activity in the project, training was address in all groups during the inception workshop. The outcomes and recommendations from all participants including all key RuWatSIP personnel, key sector resource persons, Norplan staff and invited officers from other ministries.

The general discussions concerning hydrogeological information and use of GIS information is that there is little information available and there are planners looking for such information. Thus at national level there seems to be a need to train people first in how to collect hydrogeological information and then establish the institutions to sustain data collection and data handling and reporting . Secondly, a good information system linking to GIS and MIS is needed. Once this is established people needs to be trained in maintaining this information system. With an effective hydrogeological information system containing for instance a hydrogeological water use atlas has been published for all to use, then training is needed for users for such information at national level and provincial level. The information system for the hydrogeological information should make water development more effective.

Many of the participants in the workshop stated clearly that unless the water planners started to ask for good hydrogeological maps and data or water use atlas, then the sustainability of the information and GIS system would be at risk. So training needs to be taken seriously at all levels.

This would of course mean that the work we are about to start must be best possibly coordinated with all potential users whether government ministries, private sector, NGOs, programmes and projects involved in rural water supply activities at all levels.

In the case of training for field data collection, we appreciate that project are doing this already and some planned project will address the same. In the planning phase we have to make closer links with such projects for possibly combination of training for personnel for field data collection and also for data screening and registration. This could be for project such as planned UNICEF funding for rural water supply data base, WSG database and Dacaar database, USAID supported “watertracker” system etc..

8.6 Training needs assessment

Immediately before and after the inception workshop, Norplan has been surveying the training needs for stakeholders at national level and at the provincial level in Faryab. In Kabul, the work was covered by the national training expert, Prof. Hamid, while in Faryab, the survey was made with support from the DACAAR provincial office in Faryab.

Based on the TORand the training needs assessment, the following overview has been prepared. In general, the survey listed the focus groups for training and education/skills level the training should be concentrated. The table below gives an overview of focus groups and education level.

8.6.1 Focus groups for training:

Field of training	FOCUS GROUPS AND EDUCATIONAL LEVEL			
	Post Graduate level	**Graduate level**	**Technicians level**	**Field workers**
Hydrogeology	Research and development of new methodologies, specialist training: • National experts • University lecturers	Planners and analysts on national and provincial levels. Targets: MRRD, • NGO, • Private companies, • Consultants, • Trainers, • UN staff • Students in training institutes	Field technicians for: GoA, • NGOs, • Provincial Governors, • Private companies	• Borewell developers
MIS/GIS		Designers, developers of data, training specialist software applications, users and staff maintaining MIS/GIS systems • MRRD, • AIMS, • NGOs (Dacaar), • UN staff, • Ministries	Field survey and data collections, data screening and data entry at provincial and national levels • Provincial officers, • NGOs • Private firms	
Field data collection		• Water quality sampling and testing	People to be sent out in the field to collect data, i.e. borehole and monitoring data • MRRD, • Other ministries • NGOs, • Water quality sampling and testing	• Water sampling • CDCs for reporting
Water Supply and Sanitation		Planners (national and provincial) for project design, implementation, supervision, operation and maintenance. Use of planning and design software (Watercad, epanet, MS Project • MRRD • WatSan Groups, • Ministries, • NGOs,	Project implementation and supervision, *community planning and participation,* • *NGOs,* • private operators, operation and maintenance • field surveys for water supply asset management	• Operators of pumps, boreholes, water kiosks, Mirab

As part of the training needs assessment very many of the key sector organizations were visited and professional staff eligible for participating in training under this programme was identified. The detailed numbers are listed in the survey sheets as found in Appendix 2,

In general the nature of the project covering Hydrogeological surveys is a very specialised area for those who are involved in planning surveys, data collection, and data analysis. This requires the best of expertise. Such expertise is and will be centred about a few highly skilled people with high academic training. The next important group in focus is all the people at national level who will be users for hydrogeological information or users of information how to plan for drinking water for the rural population. There are people who need to know what water resources are available in the different areas and what technology would be needed to provide safe, good quality and sustainable water supply services for the people. This is a large group of potential users for hydrogeological information or water resource information. This group will only be interested in information system when good data is available, trustworthy, and when they have been trained how to use the information. So this could be professional users at national and provincial levels. Many technicians may also be directly involved in planning of water programmes or implementation of the same. This could be staff from government organizations, but also NGOs and private sector. Since professional staff tend to be attracted to career opportunities in the big cities, it is very important that technician are well covered in the training programme as indicated below.

Training activity	University trained		Technicians		Field staff	
	Nat	Prov	Nat	Prov	Nat	Prov
0	few	No course				
Hydrogeo. Techniques/ analysis	few	few	few	few		
Hydrogeological software /use	few	few	few	few		
Hydrogeo. Info use (maps/ data)	many	few				
Hydrogeology- general	many	few	many	few	few	
Geo-physic investigations	few	few				
GIS- info design	few					
GIS-						
GIS data collection	many	many	many	many		
Field data collection				many		few
GIS data cleaning/ data entry	few	few	few			
Database design	few					
ArcGIS/ software use	few					
Using hydrogeological atlas	many	few	many	few		
Design / update of web portal for atlas	few					
Hydrology general	Many	many	many	few		
Water sampling	few	few	few	few.	few	
Water quality testing	few	few	few	few		
Water supply conceptual design	many	few				
Water supply preliminary design	many	few				
Design using autocad	few					
Network design software (Epanet), WaterCad,	few					
Training in project management with MS Project MS Project	few					
Language training (English)	Many	many	many	many		

We have identified needs and in the tables in the appendix we have listed the number of professional staff as potential candidates for training. First when we know what courses have been designed in a training plan can the number of trainees for each type of training be defined more clearly.

8.6.2 Types of training:

Hydro- geology at national level:

To train hydro geologist (specialists) in interpretation of data collected with geophysical investigations. Specialist training is required which is not locally available. International experts should be engaged for training of key hydro geologist from ministries, NGOs but also very important for Kabul University & Polytechnic to acquire enhanced expertise which can be provided to new graduates and postgraduates in Afghanistan.

The training should include the following priority topics:

- Operation of electrical resistivity and induced polarity (IP) meter,
- Data collection using the electrical resistivity and IP meter,
- Analysis and interpretation of collected data,
- Use of software for data transfer, processing, interpretation and plotting,
- Werner and Schlumberger interface,
- How to identify faults in bed rocks as potential aquifers,
- How to translate geophysical data into geological section,
- Selection of profile based on the strata set up (in line with strike or across the strike/dip
- Well logging (Geological and geophysical logging for sampling, aquifer identification, screen placement, backfilling, well development etc),

Training for use of hydro-geological information at national level:

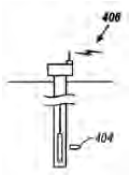
There is a need to exchange information about water availability in the provinces and districts at national level in different ministries, bilateral agencies, NGOs and private sector. It is particularly important that the different governmental planning agencies be trained to communicate and exchange information properly for effective planning in all rural areas for water supply. MRRD has equipment for hydro-geological test of the type Syscal Pro. For the operation ofthis equipment they need a license for software since existing license has expired.

There is no such training provided for users of hydro-geological information at use at national level. There is no training material available to train trainees in hydro- geological information and also no training capacity among the local staff to address training at national level but also at provincial and local levels

There is a need for provincial engineers to be trained how to use hydro-geological data and information for planning to develop of water supply projects at the provincial level. This can be professional staff from local agencies, government institutions, NGOs and private sector.

There are little training materials generally available, and this seems to need to be developed.

MRRD is to handle surveys and planning of water supplies in rural areas. In some cases water supply networks will be planned and implemented. For that purpose, equipment for surveying using **total station** and its related software for the data analyses and making of survey maps , there is two software for this purpose to be used Civil 3D 2012 and Eagle point. A lot of people interested be trained in total station and Civil 3D (3D) with supporting software. Training of survey and design engineers in MRRD for use of equipment and software for planning and implementation water networks is therefore included in the training program.



Training will also be developed for remote sensing of wells and water tables. This is a system capable of giving and updated information of ground water levels and could also be an early warning system during drought periods. It is believed that DACAAR has already tested and put such a system to use. Training is needed for extension of this system to more ground water sources.

Training program for Technicians at provincial level:

There is need for technician groups to be trained for using hydro-geological data for planning development of water points at districts and villages levels. Such training is required for government staff, NGOs as well as for private sector workers. There is also need for training in how to collect and treat data from new and existing water sources.

Some training material has been developed by different NGOs and Universities departments in past years. DACAAR has for example training material covering:

-Well construction
-Water quality
-O&M of rural water supplies
-GIS and surveying
-Planning
-Gravity flow pipe schemes
-Survey by GPS
-Project cycle management
-Database
-Hygiene and sanitation
-Basic hydrogeology
-Social aspects of RWS
-Surveying

Data Collection and Data Analysis:

The Project's most important part, is data collection and data analysis activity for preparation of hydro-geological map of Faryab. Additionally to the recent TNA survey, the project training program will be positively affected on the capacity of technical staff of MRRD and others relevant departments, scheduled for project implementation period

In close cooperation with MRRD departments, DACAAR, National and International experts, the Project continue to play a key role for capacity building of relevant organization departments. Based on demand for require information from the relevant Ministries, the project provides training facilities for relevant departments to build the capacities of technical staff in hydro-geology, geo-physic, GIS/MIS and Water Supply sectors.

Conducting GIS training course:

This is very specialized training program and few persons have been trained in the past years through the training program of some NGO's or through some scholarship programs outside of the country.

GIS is not much popular expertise in Afghanistan. Some believe this is possibly because GIS is used mainly for management of assets. Once GIS is taken to be used as a planning tool, many more would probably need to be trained in GIS. The possible trainers maybe the following organizations: AIMS, IMAP (NGO).

The concept behind the training programs aimed at increasing technical skills of relevant department's staff. The program doesn't substitute for more comprehensive technical skill development. The aims are to make a quick and tangible impact to skills and knowledge, resulting in improved quality of project proposals and its implementations. This training would be developed according to the planning schedule during 2012.

Training in use of hydro-geological information use at district and village levels:

There are no structured training programs available for technical staff drilling and developing local rural water supply facilities. Most of the time there is some on the job training, but that is very limited. Particularly training for staff working in the commercial sector is virtually absent. There is a need to develop training material for field workers at the district and village levels. The training capacities should be available through training of trainers.

Other training activities to be covered:

The training needs for technicians in sampling to test the water quality also required. This is becoming increasingly relevant since MRRD and others are increasing the number for drinking water testing labs at both national and provincial levels. Samples should be collected during development of new water sources, sampling existing water supplies for registration of existing water sources for the development of the proposed hydrogeological atlas to be developed.

For surveying of the existing water points and bore wells for hydro-geological investigation and data – information collecting, there is a need to prepare training for such staff to be address.

Water supply and sanitation development

Training will be organized in line with the TOR for use of computer based planning tools for networks and civil engineering design as indicated in the tor covering Watercad and Epanet. It is suggested that 2-3 persons travel to Norplan HQ to work with water engineer in hand is training staying is Oslo for one- two weeks.

Training will be given for conceptual design consideration for water supply and sanitation in line with WASH policy framework and conceptual methodology used for the planning of the 3 towns to be planned for in Faryab province.

Hands on training will also be provided for project management and discussions will be held with MRRD about updating of Implementation manuals for water and sanitation in small towns.

Capacity Development

Implement and monitor agreed training programs in a manner to maximize MRRD and other relevant departments' staff capacity on relevant subjects of the NORPLAN Project.

The project will provide continuous on-the-job training and technical assistance to MRRD at all stages of formal and informal planning, survey design, implementation, data collecting and analysis, interpretation of data and information dissemination. With the Norplan team located within the premises of MRRD technical support will be continuous. In addition, the Norplan team will to provide training to key staff on project as well as sector and project management skills.

Improving the existing knowledge in the field of hydro-geology, geo-physic and water supply and establish new possible framework in the fields of methodological development for the assessment of modern technical knowledge in hydro-geology and water supply planning schemes based on area needs.

The Project is going to play a more pro-active role in policy and program advice, particularly within the MRRD. At this level, capacity building aims to an improved ability to transfer the require knowledge in hydro-geological investigations and data interpretation and management to the engineers and technical workers. The outcomes of the capacity building training will be oriented the policies of the current project at national and provincial levels.

8.6.3 The expectation of the training and capacity building activities:

Institutional Capacity Building:

The institutional capacity building will take many forms but not limited to the following important aspects:

- The project will develop new methods and procedures which facilitates better and faster planning and implementation of water sector activities
- Through the institutional capacity building project in the field of hydro-geology in Faryab, strengthen water sector organizations and develops postgraduate education, professional training and research facilities with partner institutions. The implementation framework can and should be replicable to other provinces
- Coordinate well with all linked sector projects, organizations and activities like MRRD, WSG, UNICEF, Water councils, Donor groups, World Bank etc. to strengthen good communication and information exchange for more effective water and sanitation development
- To channel development ideas from the project though MRRD and WSG to strengthen existing national coordinating structure and to enhance dissemination of information and ideas to all sector actors in line with national policies
- The project staff will, to the extent possible, participate in all relevant water sector programs to learn and share information for the best possible advantage for all
- The project will through establishment of a web based hydrogeological /water use atlas extend the information which should generate a stronger and more viable rural water supply and sanitation sector.
- The project will work closely with existing and key sector institutions like MRRD, DACAAR, and others so that when the project is over, all information and developed knowledge and material will be left for local use
- Under the project, much new training material (training manuals) will be developed. This will be left an output which will be part of a technical library or information base for all sector staff in Afghanistan to enjoy.

As shown in the organogram for RuWatSIP, there are many trainees to be trained.

At the beginning of the planning phase, the training activities will quickly develop a plan how the different staff will be included in the capacity building project.

8.6.4 Planning the training component:

During the implementation phase, the project will start with drafting a training plan for the activities to be covered. This will be done in close discussions with MRRD and WSG and other key stakeholders.

Subsequently training material will be surveyed so that suitable existing training material is used and a plan will be prepared to develop the training material which is lacking.

At the same time Norsk Vann will be consulted to advise on structures and innovations how to organize and develop training materials and manuals for use of operating and implementing staff in the water sector.

The key resources to be involved in the training will be:

MRRD

| Norplan and partner DACAAR,

National training institutions / Universities/ polytechnic

International experts

National training organizations/NGOs

In order to compare planned activities with actual activities, regular monitoring will be carried out on weekly basis through NORPLAN, DACAAR and MRRD monitoring teams .The monitoring will be used as a management tool to identify strengths and weaknesses in the training and to help the fuse holders make appropriate and timely discussion that will improve the quality and keeps the training aims on truck, reviewing and planning on regular bases ,assessing whether activities are carried out as planned ,identifying and dealing with problems as they come up, building on strengths and taking advantages of opportunities to take corrective actions.

Evaluation:

The evaluation of training will be carried out in two phases:

1. At the end of training courses the trainees will pass a quiz on chosen subjects to evaluate them how they came up with training program.
2. The other evaluation step will be carried out as an impact evaluation to see the result of training in project design and implementation by trained staff.

9 THE ROLE OF DACAAR IN THE PROJECT

The terms of reference stated that the Norwegian partner for MRRD under this project should work with a local partner for the implementing of the TOR. Already in the TOR, MRRD and NORAD had selected DACAAR to be the local partner to work with Norplan for this project.

DACAAR will take an important part in the project. This covers the following aspects:

Being part of the Afghanistan institutional memory and expertise covering:

- DACAAAR has been the major NGOs for many years developing special expertise within the rural water supply and sanitation sector. As such, DACAAR has taken much initiative to see that standards and policies for Afghanistan has been developed under the Water and Sanitation Group framework which is chaired by MRRD.

- DACAAR can thus provide advise covering historic development in the sector.
- DACAAR has developed and maintained the wells database which now contains over 40000 records. This represents both important data but also expertise and knowledge how to develop, operate and sustain such information systems in Afghanistan.
- Has capacity and knowledge for implementation of field work

Under this project DACAAR will provide

- Capacity for implementation of training as may be required for on the job training or for training of trainers for different topics.
- Provide support and advise for GIS and hydrogeological for hydrogeological surveys based on own experience from managing wells database with over 40000 water supply records. Over 1200 records comes from Faryab province
- Provide capacity and expertise for surveying of unregistered water supplies for the purpose of supplementing the water data base for preparing a water use map for Faryab province.
- Assist in training MRRD at provincial levels for hydrogeological surveys, hydrogeological investigations (once training material is ready), for training of drilling team in MRRD how to conduct drilling and data recording with subsequent setting up of data logging of water points.
- Assist in conducting workshops at national and provincial levels as may be required.
- Provide training in water sampling and analysis where appropriate.
- Assist in facilitating developing of surveys for 3 selected towns for later development of sustainable water supply and sanitation services.
- Provide assistance to Norplan on planning and testing an operation and maintenance system as outlined in the WASH policy document
- Assist in providing updated sector information about what is taking place at national, provincial and district levels as appropriate.
- Provide assistance in planning and design of water supply and sanitation in 3 towns including community planning interacting during the process.
- Provide Office facilities for Norplan while in Maymane
- Provide security advise and security brief for all Norplan personnel

In Faryab DACAAR will provide much of the field expertise necessary for implementation of the surveys to be made. This will be organised together with PRRD personnel.

As the training plan is being developed, if is most likely that DACAAR organise and manage the training of technicians and field personnel where appropriate in close coordination with the training expert in Norplan and MRRD.

10 THE ROLE OF MRRD, PRRD AND CDCS IN THE PROJECT

MRRD is the client to whom Norplan report. The RuWatSIP department will at the same time be the main recipient at national level receiving support from the project for capacity building. MRRD has signed a bilateral agreement with the funding agency NORAD. In this agreement NORAD will provide funding while MRRD will provide project support in terms of counterpart staff time, office facilities, and equipment such as drilling rig and hydrogeological equipment for field investigations.

As the client for the project RuWatSIP will be responsible for providing answers and responses to Norplan as may be needed for efficient implementation of the project including handling of all contract issues, technical and progress reports and other information or documentation which the project may generate.

RuWatSIP is the organization within MRRD responsible for policy formulation of the rural water supply and sanitation sector. As such, RuWatSIP chairs the WSG meetings for sector coordination and monitoring. RuWatSIP also attends meetings under the Supreme Council for Water Affairs and Management (SCWAM) covering rural water supply and sanitation. Follow up and advice for policy formulation is an important part of MRRD. In addition MRRD will cover the following for the project:

- MRRD will assist in gathering data and planning for the project. This would cover issues such as:
- Policy discussions and new relevant policy formulation
- Assistance to Norplan to get access to information from other internal / MRRD project activities or to assist in obtaining needed and relevant information from other sector ministries such as Ministries of Mines,, Water and Energy, Agriculture , Irrigation and Livestock , and other public agencies
- MRRD will contribute to the project by making available a rotary drilling rig for use in Faryab. Consumables and per diems for field staff will be covered by the project.
- MRRD will present staff for training for capacity building within RuWatSIP.
- MRRD will provide office accommodation for the consultant.
- MRRD will identify personnel to be linked to external organization of institutional cooperation during and after the project implementation.
- MRRD will actively facilitate during workshops and meeting to assure best possible coordination with other government of sector stakeholders covering of activities handled in the project.
- The Provincial office for MRRD (PRRD) will be important for the work in the province. The PRRD will handle the following:
- Liaise with governor and provincial development committee for assessment of water and sanitation development needs and priorities.
- Provide advice about existing water supply and water resource situation in Faryab province. Present provincial priority development for water and sanitation facilities
- Assist in identifying three suitable towns for conceptual and preliminary design for water supply and sanitation
- Assist in providing access for survey of water supply situation in mentioned 3 towns.
- Present staff for training for the tasks and assignments to be undertaken in the field which required government support staff. Work closely with Norplan and Dacaar for project planning and implementation
- Provide updated security information.
- Assist in organizing provincial workshops for project planning, project monitoring and project evaluation as well as facilitating for planning of water and sanitation facilities for three towns.
- Assist project personnel in facilitating workshops with neighboring provinces for planning replication of provincial hydrogeological surveys to other provinces.

Through the PCU which already is established, the PCU members and the project coordinator will on the daily basis provide counterparts for the project. This is important for the effective management of the project.

The PCU will provide support for the effective implementation of the project. The PCU will be the management and counterpart staff for the project. The project coordinator will be the daily manager of the project in RuWatSIP reporting to the Director. The named staff in the PCU is as follows:

Director MRRD, RuWatSIP

Director Eng. Ghulam Qader

Staff members for the PCU are:

Project coordinator M. Safi
PCU member Dr. Naqib Taib
PCU member Eng. M. Naeem
PCU Member Eng.Hydrogeo: A. Jalil

The PCU will be on the daily basis manage and handle the following in the project:

- Organize counterpart staff to be involved in the project in addition to the PCU members
- Identify and list personnel available for training and though whom further capacity in the department should be built.
- Review and respond to report and proposal from the project which require feedback from MRRD on how to proceed
- Participate in planning and implementation of workshops and meetings a national and provincial levels.
- Facilitate good coordination between the HGS project and other MRRD ongoing and planned projects in the sector and with UNICEF, WB and other key sector actors who could support of benefit from information from the project
- Liaise with WSG, main and sub committees the findings and feedback on issues of importance for the project.
- Assure that staff and drilling equipment is available for the project in line with plans for the project.
- Review and comment on information published on the project web page.
- Promote in relevant fora information and outputs from the project including HGS data and availability of water use atlas when available.
- Assist in preparing specifications for equipment and material required for the project
- Other tasks as may be necessary for effective implementation of the project
- Provide liaison between project and senior/ political management in MRRD.

MRRD and RuWatSIPs contribution to the project.

In line with the bilateral agreement, MRRD will provide a significant contribution to the project. This subchapter has been included now in the revised inception report.

During the project MRRD and RuWatSIP will participate actively in the project. The participation will take form as described below:

Project personnel and counterparts	
	Inception and planning phase. As part of the project development, the planning phase is a tedious and time consuming process requiring technical discussions and consensus building and well as project coordination with other sector activities. Key MRRD personnel are essential in this process. In the planning phase key RuWatSIP staff time inputs will be concentrated on senior technical and management staff such as the Director, the Project Coordination, Senior Training adviser, the Senior Hydro geologist and the Senior Water Supply Design engineer.
	Implementation phase- training As the project moves into the implementation phase a large number of training courses will be implemented. It has been agreed that for the sake of capacity building, for all courses which are repeated more that once, a MRRD/ RuWatSIP staff member will be heavily involved so that the second and third courses would be organised by the RuWatSIP staff member and if possible also delivered by that person with the support of project staff. Knowing that there will be about 40 courses, this will be a strong RuWatSIP focus on the project.
	Field work For the field work in Fayab, much of the activities will initially be planned by project but the implementation will be organised put DACAAR field staff accompanied by RRD and MRRD staff for capacity building and for

	support.
	Water analysis A number of water analysis will be made for the surveys to be conducted in Faryab. Already it has been noted that there is a need to implement a quality control/ training program in order to be able to utilise local laboratories for the project. RuWatSIP is in the process of establishing water laboratories and national and regional levels and if quality control can be established soon, then RuWatSIP is in the position to provide project support by utilising the capacities of its own laboratories
Drilling rigs with drilling crew	
	MRRD will support the project by making two of their rigs available for the project including staff to operate the equipment. Although at this stage it is not know exactly where drilling will be undertaken nor is it known to what depth the drilling is required. These issues are yet to be detailed after the field survey will indicte where exploratory borewells would be required in Faryab. For training and capacity building at National level, it is proposed to drill probably two boreholes within the MRRD compound purely for training purposes. MRRD will provide a drilling rig for this purpose and in addition, RuWatSIP will most likely have most of the down- the –whole parts like casing and screens in its stores in PoleCharki which will be made available for the training boreholes. These boreholes will be left and completed for repeated training courses and demonstrations for hydogeological investigation techniques using new equipment.
Office facilities in Kabul	
	The project team will be housed in the RuWatSIP building in MRRD. Two offices has thus been provided in addition to a space in the centre of the staircase which has been boxed in to make a store facility for the project. In addition facilities will be made available to use conference rooms available for meetings as well as for training facilities.
Space for training boreholes at MRRD	
	Permanent space will be set aside for making use of sunk training borewells. Training will be provided for MRRD personnel as well as personnel from other government organizations, NGOs and for private sector when and as required.

11 PROPOSED ROLE OF ACADEMIA IN THE PROJECT

The project participants believe that one of the firmest ways of anchoring good practice in hydrogeological surveying in Afghanistan is to create a vibrant academic hydrogeological environment around the project's activities. The project's hydrogeologists within MRRD and DACAAR are already involved in publishing their findings in international journals and conference proceedings. The two

main universities in Kabul (Kabul University and Kabul Polytechnic University) employ experienced and enthusiastic hydrogeologists - Prof. Ibrahim Najaf at KPU and Prof. Naim Ikrar at KU - although their respective institutions suffer from varying degrees of lack of funding, laboratory facilities and practical data / field sites for their students. We plan to involve the two Universities within the project in several ways:

- Inviting hydrogeological staff of KU and KPU to become involved in subproject 1 of the Project (collation and publication of hydrogeological data).
- Installing a 70 - 80 m deep training well at one of the following locations, for use in the practical training of water sampling, test pumping and geophysical techniques. We anticipate that any agreement for use of the training well will secure the rights of all three parties (MRRD, KPU and KU) to use the well for teaching purposes for the foreseeable future. Possible localities include (i) the campus of KPU (although rock-head is expected to be encountered at shallow depth), (ii) the southern part of the campus of KU, (iii) the MRRD Rural Technology Park adjacent to MRRD offices.
- To carry out some of the Programme's training activities at the facilities of the two universities and, to the extent possible, to involve KU and KPU staff in the training activities.
- To invite a guest international hydrogeological lecturer once every year to speak at an open hydrogeological seminar. The seminar will also include reports of progress of the Project and will include opportunities for discussion about the Project Programme. The seminar will be held at one of the two Universities and consideration will be given to organising it under an IAH banner. Participation from the Universities, the Ministries and the NGO/private sector will be encouraged (indeed, all hydrogeologists in Afghanistan (NGO, private sector, university, government etc) we be welcome to participate in seminar and all training activities, due to the limited total number of Afghan professional hydro-geologists (although some participants may be expected to pay a small fee for participation).
- To offer hydrogeology students from the two universities the possibility to complete their dissertation work on the basis of joint field work with DACAAR in Faryab province or using data resulting from the Project, subject to security and safety concerns.
- To design project training materials with a view to their being subsequently used as part of undergraduate hydrogeology teaching at the Universities.
- To invite senior hydrogeological staff from the two universities to sit in on scientific planning meetings.
- To offer Engineers/ Hydrogeologists the opportunity to complete PhD degrees in parallel with the Project. As neither teaching University currently offers a PhD programme, some agreement would have to be made with another international academic institution if this plan were to come to fruition. The most qualified and able national candidates from government ministries, NGOS of private sector should be invited to apply for scholarship.

12 INVOLVEMENT OF OTHER ORGANS / NGOS IN PROJECT

- During the inception workshop, it became evident that there are key resource personnel in other organizations and institutions who could strengthen the project through involvement. Ministry of Mines is clearly a ministry who is most relevant for the project and which should be involved. During the planning phase of the project, the involvement would be more clearly defined. The same applies for Afghanistan Geological surveys (AGS)
- If possible, closer contact could also be developed with UN organizations like UNICEF who has provided very much support to RuWatSIP for institutional development and technical support. Closer corporation covering ideas and implementation of training and data base development should be further pursued.
- The HGS project covers conceptual, institutional and technical issues and such should be linked to other key sector projects where lesson learnt could be used. For enhanced impact, links with World Bank, other water sector donors support programmes like USAID, KFW, JICA and EU supported project activities particularly within the area of capacity building should pursued.
- Other organizations like USGS, AIMS will be further contacted to work out degree of involvement. USGS has already provided discs with hydrogeological information which is being analyzed as part of the gathering of baseline information.
- As the project develops, there is full opportunity to involve key WSG stakeholders in the project concept ideas and concept testing if any organization so desire.

13 IMPLEMNTATION SCHEDULE

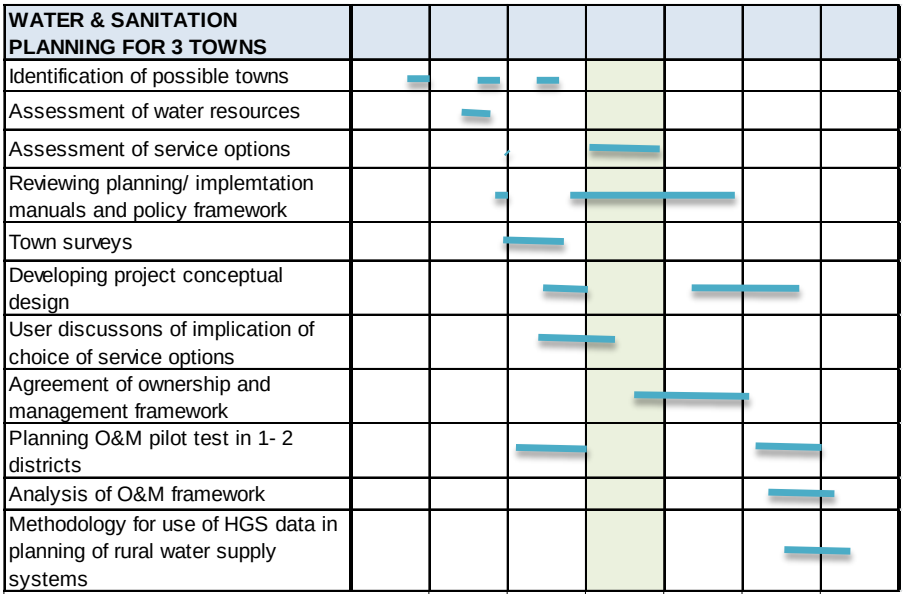
In the tables below we have presented the planned schedules for the different activities included in the planning phase. Being a project which is implemented in close corporation with MRRD and other sector activities in Afghanistan, changes and minor variations are likely to take place but the main

	Apr	May	Jun	Jul	Aug	Sept	Oct
PLANNING PHASE							
WORK VISIT CALENDER							
Visit international staff							
KEY EVENTS							
Provcincial workshop, Maymane							
National water confernce							
HYDROGEOLOGY							
Data collection, maps and GIS							
Team 1: Hydrochemistry data							
Team 2: Hydrogeo data							
Team 3: hydrological data							
Data analysis/ support (DB)							
Planning pilot survey							
Planing borehole training							
Soil salinity survey							
Implementing pilot rapid survey							
Translation of instruction manuals to DARRI							
Dev. Specifications for geophysical equipment							
Soil samples sent abroad for analysis							
Preparation of report							
Survey unregistered existing water sources in districts .							

implementation strategy is included in the charts.

Key Activity	Planning phase (6 months)						
	Apr	May	Jun	Jul	Aug	Sept	Oct
MIS/ GIS workplan							
Purchase and install ArcGis 10 inc. HW and Spatial Analyst							
Structutre esisting data and colledtion of new data							
Identify MRRD personell and equip staff as counterparts							
Design and implement database, forms and web interface.							
Establish database using existing data (MRRD / DACCAR / others),							
Connect database with the GIS / MIS							
Define procedures for data registration and maintenance							
Do registration and quality check work in Faryab							
Establish hydrogeological/ water atlas							
Develop methodology and design of atlas – possible involvement from academia							
Collect data required for the atlas							
Design and produce atlas							
Develop and train in methodologies for maintenance of atlas							
Prepare manuals for GIS and MIS system to be used							
Design and publish web protal for atlas incl. Web-map solution							

Key Activity	Planning phase (6 months)						
	Apr	May	Jun	Jul	Aug	Sept	Oct
TRAINING WORK PLAN							
Collating existing training material and review for use/suitability							
From list of trainig cources, identify training material to be developed.							
Prepare design/format for traing material with support of Norsk Vann							
Preparing training plan							
Prepare training plan for MRRD and PRRDs/ Faryab							
Train MRRD staff for GIS /MIS							
Train field staff for GIS data collection and handling							
Plan new training cources for training of trainers (TOT)							
Make syllabus for new courses							
TOT training including short term training abroad for 3-5 staff							
Prepare new training materials and manuals							
Organise external agencies to participate/benefit from training							
Finalise training implemntation plan							



14 PROJECT RISKS

14.1 Security

The security situation is a challenge for all project staff. However, with the staffing arrangement and with the combination of both national and international staff in good communication. It is hoped that the project may proceed as well as can be expected. We have to acknowledge that if there are security incidents this can quickly affect international staff travelling Afghanistan. Local staff man also be effected for work in Kabul and for field work in Faryab province. Local staff may also be effected by the security situation in Kabul and it is not uncommon that staff have to stay home or away from the office for security reasons.

Norplan has tasked DACAAR with providing security briefing and advice to project staff working on the project. This means that international staff register with their respective embassies and with DACAAR. The DACAAR security officer provide security advice continuously to project personnel. We have also found it necessary to have a dedicated security officer at HQ who follows up with the registrations with the embassies, international staff, insurance firms and also a person who in Norway always can provide information to dependents about the situation for project staff in Afghanistan.

The security situation in Faryab is also challenging. Field work in Faryab depends on having secure access to the rural areas. Many areas are currently inaccessible and the situation seems to be deteriorating with the ISAF soldiers withdrawing from Maymane. DACAAR have more than 100 local staff working in the province and thus have good security information where field work can proceed. It is a fact that DACAAR has access to fewer areas now that what was the situation one year ago. Lack of security and access to rural areas in Faryab can affect the project adversely. Contingencies may have to be considered so at to assure that Afghanistan and as much as the focus areas are benefitting

from the projects with hopes for new and better tools and skills to find safe and relayable drinking waters in the rural areas.

Also without access to the rural areas in Fayab it may not be possible to identify appropriate towns for development nor go to the field for surveys and plans.

14.2 Project expectation management

The project is principally focussing on capacity development for the water sector within the sector of hydrogeological survey for rural water supply. That is not the challenge, but since Faryab province has been identified as the pilot province for the project. This may be quite appropriate for Government staff in MRRD, provincial planner and politicians may have more concrete project outputs from the project such that the project may provide an increase in water supply coverage in the province. Futhermore, lack of water and salty water is a serious problem in Faryab province and even though most provincial leaders are aware of that fact, it may be difficult for them to accept that there is no specific and substantial development activities. Project staff will talk about the plans for the three towns which are to be prepared and hope that if this is well completed, appropriate and realistic, finance may be forthcoming from the same or other donors.

What is the understanding of three towns as described in the TOR. The issue was raised during the inception workshop and there may be some difference in understanding what this would mean. From the one document which mention survey of three towns with big networks, to the mentioning of just three towns. Others at the workshop mentioned that it could possible mean three districts. We would probably find it reasonable to assume that we will be looking for towns but the size of town will greatly influence the amount of work needed for surveys and preliminary designs. It would make sense that this issue is clarified before the first provincial workshop in Faryab is held-

14.3 Trained Technical staff leaving

This is of course not specific to this project. But for any staff sent on longer training courses they will have to be bonded to continue working with the organization they came from. For specialist staff like IT, and other specialists there is always the challenge of key personnel leaving. This will be so till the market is saturated and that will take time. For the project we will propose that external support be provides as part of the institutional cooperation so to cover:

1. Half yearly support for support to training expertise and training of trainers and updating of training plans (Norsk Vann)
2. Support to review and update design and web-interface for the hydrogeological / water use atlas to assure that developed information remains available to all sector planners in the foreseeable future. Propose say 4 weeks annual support between MRRD and Norwegian partner institution like Norplan or similar organization
3.

14.4 Community based planning for water supply and sanitation for rural towns.

Another challenge and implementation risk for this project is that when following Afghanistan Water and Sanitation National policies, an agreement is made with the community of roles and responsibilities before proceeding with detailed planning for WatSan activities. It is agreed what contribution the communities will provide and what they will for the survey, planning, construction and operation and maintenance. In return the supportive implementing agency inform what they can provide and contribute to the project. Often, the institutional input man account for up to 90% of the project costs with the communities providing the rest. It is difficult, if not to say impossible to mobilise communities to any planning activities unless there developing agency can promise to provide

funding. The communities want to see proof that the implementing agency can deliver before their contribution becomes wholehearted. Many communities have often been promised development and projects that does not materialise. So from bitter experience communities may be very reluctant to mobilise if the project does not have funding for implementation. Unless MRRD manage to secure funding, the progress with planning water supply and sanitation facilities in three towns in Faryab may be jeopardised.

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Work Plan

WORK PLAN, as in proposal for reference.

WORK PLAN

No	Task or Activity | Project Months	Inception		Planning Stage						Implementation Stage																												
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	**Inception**																																				
1.1	Mobilisation																																				
1.2	Establish project office at MRRD																																				
1.3	Finalise and manage DACAAR contract																																				
1.4	Procurement of materials and equipment																																				
1.5	Formation PCU and nominate staff for training																																				
1.6	Undertake TNA																																				
1.7	Visit to Meymaneh to meet provincial staff																																				
1.8	Liaise with related ministries and stakeholders																																				
1.9	Address hydrogeological challenges																																				
1.10	Start data collection from various institutions																																				
1.11	Outline principal activities for the planning stage																																				
1.12	Prepare and finalise Inception Report																																				
1.13	Conduct Inception workshop																																				
2	**Planning**																																				
2.1	Prepare detailed ICCB training program																																				
2.2	Prepare design of the HGS																																				
2.3	Collect and analyze historic data																																				
2.4	Undertake pilot hydrogeological survey methods																																				
2.5	Establish procedures for the drilling and test pumping																																				
2.6	Establish and agree routines for data collection																																				
2.7	Assess content of the MIS at MRRD																																				
2.8	Define gaps in the database structure and content																																				
2.9	Plan how missing data can be collected																																				
2.10	Prepare conceptual design for 3 WS schemes																																				
2.11	Assess alternatives for WS to 3 selected towns																																				
2.12	Analysis of financial alternatives and risks																																				
2.13	Updated work plan for the Implementation Stage																																				
2.14	Prepare detailed budget for the Implementation Stage																																				
2.15	Prepare and finalise Planning Report																																				
2.16	Conduct Bridging workshop																																				
3	**Implementation**																																				
3.1	Undertake the HGS																																				
3.2	Preliminary design water supply for 3 small towns																																				
3.3	Implement ICCB training program																																				
3.4	Prepare draft HGS Report																																				
3.5	Undertake HGS winding up workshop																																				
3.6	Analyse results, improve and update the MIS																																				
3.7	Prepare MIS Report and MIS Manuals																																				
3.8	Prepare Draft Completion Report																																				
3.9	Conduct project winding up workshop																																				
3.10	Prepare Progress Report																																				
3.11	Prepare Final Completion Report																																				

No	*Outputs, deliverables and milestones*																																				
1	**Inception stage:**																																				
	Draft Inception Report including a TNA and detailed work schedule for the Planning Stage		x																																		
	Inception Workshop		x																																		
	Final Inception Report		x																																		
2	**Planning stage:**																																				
	Draft Planning Report			x				x																													
	Bridging Workshop							x																													
	Final Planning Report								x																												
3	**Implementation stage:**																																				
	Capacity Building Report		x																														x				
	MIS Report and Manual		x									x																					x				
	Draft HGS report		x																														x				
	HGS Winding up workshop																																x				
	Final HGS Report																																				
	Draft Completion Report																																	x			
	Project Winding Up Workshop																																		x		
	Final Completion Report																																				x
All	**Progress reports:**								x						x						x						x							x			

PERSONNEL

Name of Staff	Level of Education	Firm or Organization	Area of Expertise	Years of experience	Position assigned	Task assigned
Dr S. Stoveland	B.Sc, M. Sc., Ph.D	Norplan	Strategic water and sanitation eng.	34	Team leader	Sector strategy Institutional, technology
D. Banks	B.Sc, M.Sc	Holywell UK	Hydrogeology	26	Hydrology expert	Hydrogeology: Methodology, workplan, reports, trainingg
A. Norboe	B.Sc., M.Sc., B.A.	Norplan	Water engineering, management	35	Training expert	Training methodology, training material
T.G.Overli	M.Sc.	Norlpan	Geothematic	20	GIS- MIS expert	GIS/ MIS review, design, reports
Alexander Kristiansen	M.A.	Norplan	Senior economist	17	Financial analyst	Financial analysis, reports
Elisabet Eikaas		Norplan	Gender, social anthropology/ conflict	3	Anthropologist / gender / Conflict	Gender issues, conflict, implementation of HGS/ water supply services
Gisle Grepstad	M.Sc.	Norplan	Hydrogeology	26	Hydrology expert, backstopping	Support hydrogeology
Magne Kløve	M.Sc.	Norplan	Water engineering, design, network design	18	Conceptual/ Preliminary water supply design backstopping/ QS	Water design inputs, QS/
Knut Terje Ellefsen	B.Sc., M.A.	Norplan	Socio economist/ water eng.	32	Backstopping	Logistics, contract adm. Backstopping
Local/ regional staff						
N. Abrar	B.Sc.	Norplan/ Freelance Kabul	Water engineering, irrigation, water resources	8	Local deputy Norplan team leader	Daily project manager Kabul office. Support and facilitation of all consultants, liaise MRRD & stakeholders. Water supply design. Data collection.
M. Hamid	B.Sc., M.Sc., Ph:D.	Norplan/ Kabul Polytechnic	Training, water engineering,	36	Local training expert	Training expert, logistics training support, preparation of training material
Local GIS expert	B.Sc., M.Sc.		Hydrogeology and GIS, remote sensing			

FORM T8 STAFFING SCHEDULE

Ref	Name of Staff	Possition	Total staff month input																																		Total staff input		
		Project Phases	Incept		Planning						Implementation																												Home	Field	Total
No	Foreign NORPLAN Staff	Project Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Months	Months	Months
1	Dr. Svein Stoveland	Team Leader Water and sanitation sector expert	0.25	0.50	0.40	0.75	0.50	0.25	0.70	0.25	0.75	0.25		0.25	0.25	0.25	0.25		0.25		0.25	0.25		0.25	0.25		0.25	0.25		0.25	0.25		0.25		0.25	0.50	0.25	0.25	9.35		16.2
			0.50	0.25	0.50		0.50	0.25		0.50		0.50		0.50	0.50		0.30		0.30		0.30		0.30		0.30		0.30			0.30			0.25			0.25	0.25		6.85	
2	David Banks	Hydrogeology Expert		0.50	0.25	0.50		0.50		0.50			0.25			0.25		0.25				0.25								0.25					0.25	0.25			4		7
				0.25			0.50		0.50			0.50					0.50						0.50														0.25			3	
3	Asbjørn Nordbø	Senior Training Expert	0.25	0.50	0.25	0.50	0.25	0.25	0.25	0.50			0.25				0.25			0.25		0.25																	3.75		7.5
				0.25	0.25	0.25	0.50		0.50			0.50						0.50						0.50				0.50												3.75	
4	Tor Gunnar Øverli/Frank Haugan	GIS expert		0.25	0.25	0.55		0.25		0.50		0.25	0.25					0.25	0.25							0.25							0.25	0.25					3.55		4.8
				0.25	0.25			0.50				0.25																												1.25	
5	Alexander Kristiansen	Financial Analysis		0.25		0.25			0.25								0.25							0.25										0.25					1.5		2.25
								0.50																													0.25			0.75	
5	Knut Terje Ellefsen	Socieconomic analysis	0.25	0.25		0.25			0.25															0.25										0.25					1.5		
																																									0	
6	Elisabet Eisaas	Social Anthroplogogist- Gender				0.25								0.25																					0.25					0.75		
				0.25			0.50		0.50								0.50																								1.75	
6	Trond Kaulum	*) Backstopping: Training & HRD				0.25			0.25																															0.5		8.5
						0.25											0.25																								0.5	
7	Magne Kløve	*) Backstopping: Design Water Supply Systems							0.25							0.25	0.25																								1		
																																									0	
8	Giske Grepstad	Hydrogeology/ D. Banks	0.25					0.25													0.25														0.25					1		
				0.25	0.25			0.25																																0.75	
8	Berit Hultman	HQ security Adm support/				0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25					0.25		0.25					3.5		3.50
																																									0	
	*)Input Backstopping to be determined according to need. Time allocated is indicative.																																					Sub Total	26.9	18.6	46.25
	Local NORPLAN Staff																																								
1	Naqibulla Abrar	Norplan deputy	0.5	0.75	0.75	0.75	1.00	1.00	0.75	0.75		0.50	0.75	1.00	0.25	0.50	0.75	0.75	0.75	0.75	0.75	0.75	0.75	1.00	0.75	1.00	1.00	0.75	1.00	0.75	1.00	0.75	1.00	0.75	1.00	1.00	1.00	1.00	27.75		31.75
			0.25	0.25	0.25	0.25			0.25	0.25			0.25		0.25		0.25		0.25		0.25		0.25		0.25			0.25		0.25		0.25		0.25					4	
2	Prof. Muhammad Hamid	Traiing expert	1.00	1.00	1.00	1.00	0.75					1.00	1.00	0.50				0.50	0.50	0.50			1.00				0.50							0.25	0.25				10.75		14.25
				0.50		0.25	0.25	0.25	0.25			0.25	0.25						0.25	0.25			0.25	0.25			0.25						0.25							3.5	
3	Local GIS experti	GIS spesialist																																					0		5.75
				0.50		1.00	1.00		0.50	0.50		0.50			0.50						0.50													0.50	0.25					5.75	
4	Admin finance officer				0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	33.5		33.5
																																								0	
5	Logistics officer					1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																									10		10
																																								0	
																																						Sub Total	82	13.25	95.25
																																						Total	108.9	31.85	140.75

This table T8 continued highlights the breakdown between the different stages on the project phase, Inception, Planning and implementation. Not possible to get into one A4 page.

15 APPENDECIES

15.2 Summary tables for training needs assessment

Table 1 : TNA National level:

TRAINING NEEDS ASSESSMENT SUMMARY SHEET- NATIONAL LEVEL										
S/N	**Name of Organization**	**No. trainees proposed**	**Field of education, No. of trainees**	**Degrees, Certificate) / University**	**Work experience (year)**	**Number of Training for Experts and Engineering trainings**				**Trainees1 applied for Technicians Training fields and other training**
1	Geo – Engineering N& Hydro Geological Researches Department	13	Geologist -6, Chemist -2, Metallurgy-1, Hydro-Meteorologist -1, Baccalaureates- 3	Master-2 Bachelor-8 Certificate-3	From one to 34	3		4	6	1
2	Afghanistan Geological Survey (AGS)	4	Geologist – 2 Techniques of motor, Geodesist	Master-1 Bachelor-1 Baccalaureates -2	From one to 30	1		1	1	1
3	Kabul Strategic Business Unit, KSBU /AUWSSC	9	Water supply & Heating system -7 Baccalaureate -1	Technicians 14 class- 7 Certificate - 1	4 – 25		1			8

4	Water Management & Technical Service Department of MEW	10	Geo-science – 1 Hydro-geology – 9	Bachelor-9 14 Class Certificate-1	3 – 30	4			2	4- Plumbing, drilling ,Drilling, sampling and request for hydrology course
5	Water Supply Program of Geo-Physic Department / MRRD	5	Geologist – 4 Geo-Science - 1	Bachelor - 5	2 – 34	5		5	5	
6	Engineering Section Wat SIP/MRRD	10	Civil Eng- 3 Hyd-Struct. – 3 Geologist – 3	Bachelor – 9	1-27	1	6		9	
7	Water Supply Program MRRD/ MIS Reporting. Dep	4	Computer-Science-1 Economic -1 Baccalaureate -2	Bachelor -2 Certificate-2	2-28				4	
8	Lab. Staff of WS/MRRD	4	Hydro-Geology-1 Chemical Technology-1 DVM degree-1 Management-1	Bachelor-1 Master-1 Baccalaureat-2	2-20	1	3	1	4	3

9	Hygiene Education. Sanitation/MRRD	4	Literature -1	Master-1 Baccalaureat-3	2-11				4	
10	Irrigation Dep. Of MAIL	22	Geology, Agronomy, Agriculture Development, Elector-mechanic, Construction, Industry, Economic and Planning, Commercial Administration, Civil Eng.	Master, Bachelor, Certificate	1-16	10	13	13	22	10
11	National Environmental Program Agency (NEPA)	9	Technical Exploitation, Weather forecasts, Agronomy, Economic, Plant protection, Agriculture , Hyro-meteorology	Master, Bachelor,	1-9	1	1		7	
	Total	**94**				**26**	**24**	**24**	**64**	**33**

Table 2 : TNA Provincial level for Faryab province.

TRAINING NEEDS ASSESSMENT - SUMMARY SHEET FARYAB PROVINCE										
S/N	**Name of Organization**	**No. trainees proposed**	**Field of education, No. of trainees**	**Degrees, Certificate)/ University**	**Work experience (year)**	**Number of Training for Experts and Engineering trainings**				**Trainees1 applied for Technicians Training fields and other training**
						Hydro-geology	Water Supply	Geo-physic	GIS MIS	Drilling, plumbing, sampling for water quality test , other training
1	Dutch Committee for Afghanistan (DCA)	2	Veterinary, Economy	Master, certificate	2- 24					Proposal Writing, Management Networking
2	NCA Faryab Office	3	Education, Civil Eng. Agriculture	14 Class, Bachelor	1-5		1			Proposal Writing Agriculture Management,
3	INTERSOS	3	-	Bachelor, Certificate	1-11					Monitoring& Evaluation, Proposal writing
4	ACTED	6	-	Master-1 Bachelor-2 Certificate-3	6-25	1	4	1		Social Water Management
5	UN / Faryab	1	Social worker	-						Management & Accounting
6	Sanayee Development	4	Literature, Biology	Bachelor, Certificate	3-4					TOT, TOR

	Organization (SDO)									
7	CHA	6	Hydrology, Geology, Agriculture, Construction	Bachelor						Agriculture, Engineering Field
8	Faryab Municipality	7	-	-						Proposal Writing, Management, Proposal writing, Environment
9	Faryab Provincial Council	6	-	-						Proposal Writing

15.3 Visit Kabul: Diary February 2012, Norplan team

30th January 2012

6:30 Svein Stoveland to leave Kristiansand for Kabul

31st January 2012/Tuesday

7:30 Svein arrive Kabul
10:30 Meet Abrar and discuss program
12:30 Meet MRRD, Dr Naqib, Eng. Naim
15:30 Meet Leendert, DACAAR to discuss work on Inception workshop agenda

1st February/ Wednesday

10:00 Meeting MRRD to discuss details for the agenda and invitation letters to ministries.
Present : MRRD Dr. Naqib, Eng Naim,. Eng Safi, Dacaar; Leendert, Bismillah Pataan,
Norplan: Stoveland, Hamid, Abrar. Agreed detailed agenda with Director.
14:00 Meeting NCA: Hydrogeologist Essanullah, Hassan, Manager.
Discussed NCA contribution and support for the project and participation in the Workshop.

2nd February /Thursday

7:30 Meeting with DACAAR to discuss contract NORPLAN- DACAAR
10:30 Visit Standard Chartered Bank for application to open account
11:30: work in the Guesthouse

3rd February

Working in the guesthouse: Team should have arrived at 7 in the morning. Airport closed for snow.
Working with Abrar
Starting buying material for workshop
Preparing list for resource people
Prepare list of content for inception report
Sending maps and info to resource persons
11:00 Meeting World Bank Jun Matsumoto

4th February

Team arriving finally at 19:00 (Norbo, Overli and Grepstad)

5th February

Meeting MRRD, presentation of staff to director and staff.
Meeting with DACAAR at 13:30. Whole team and meet whole team from DACAR

6th February

Preparation for Inception workshop. Meeting MRRD afternoon. Stoveland, Abrar,
Banks and Grepstad discuss hydrogeologists at MRRD.
Tor Gunnar meets GIS and MIS at MRRD.
Reza Ghafuri arriving at airport early. Picket up by driver.

7th february

Inception workshop, day 1

8th february

Inception workshop day 2

9th February

Summary of inception workshop, results and preparation of TOC and work to be done by the team for inception report.
Meeting NCA: 11:30 Grepstad, Banks, Norbo.
Meeting: DACAAR: Stoveland, Abrar, contract discussions
Gisle and Tor Gunnar leave Kabul: 15:00

10th February

Stoveland/Abrar. Meeting with World Bank, Jun Matsumato
Banks, Norbo in sightseeing in Kabul.

11th February

Donor meeting, 9:00 USAID, KFW , JICA, CIDA, WB in Min of Energy and Water. Stoveland, Abrar and Norbo
Meeting 11:00 in MRRD sumarising status on progress.
Interviewing candidates for Admin/finance/ International club/ Abrar/ Norbo

12th February

Dave and Abrar to MRRD and Min of Mines for maps and data

13th February

Dave and Abrar to Min of Mines and USGS for maps and data
Asbjørn/ Hamid worked on outline for TNA
Depart Kabul with Safi Air in the evening.

15.4 Procurement procedures for Norplan

Procurement Checklist Sheet:

Draft

To be filled by Norplan senior staff prior to all procurement exceeding of USD 1000

Drafted by Banks/Stoveland 15Mar 2012

Background	This sheet to be used together with the NORPLAN procurement guidelines
Goods /service to be procured	Brief description of items/services to be procured:
Estimated cost	Estimated costs Cost in Afghani :....., Cost in USD……
Budget	Is procurement coved in budget, and if so which budget?
Procurement procedure	Procurement procedure to be followed: Category A:....., Category B:....., Category C:....., Category D:....., Category E:.....,
	Does specifications need to be approved by MRRD?

Specification	If approval is needed, has approval been obtained
Forwarded approval	Sheet to be forwarded to Team leader for approval prior to procurement of goods and services and costing above USD1000 (Category, B, C,D and E.) Signed: Date (to be filled by /signed by deputy or team leader, Norplan HGS project. Scanned and forwarded)
Approval **Team leader**	Team leader approval. Sign/date.

Procurement Guidelines

Draft guidelines for procurement **under the MRRD HGS Project financed by NORAD** Revised by SST 19th March 2012	
	NOTE: The procurement rules have been developed in line with the requirement in the

<table>
<tr><td>Background</td><td>contract between MRRD and NORPLAN where it states that all procurement for the project should be procured in accordance with best international practice.

Under the bilateral agreement between NORAD and MRRD, the MRRD will be responsible for the specification and procurement of the services of a Norwegian Partner for the project. The Norwegian Partner (Herein Norplan) will be responsible for all other procurement under the project,

The accounts of NORPLAN will be audited locally and well at in NORWAY after the completion of the project as required by NORAD.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Procurement framework</td><td>Procurement rules will apply in accordance to the value and nature of the product to be procured.

Procurement level

<table>
<tr><th>Category</th><th>Estimated value</th><th>Procedure for tendering</th><th>Opening tenders</th><th>Evaluation</th><th>Action/ sign by.</th></tr>
<tr><td>A</td><td>Less $1000</td><td>Local shopping</td><td>No tender</td><td>N/A</td><td>TL/ DTL</td></tr>
<tr><td>B</td><td>-$1000-$5000</td><td>Team leader/ deputy to visit 3 shops and obtain price</td><td>No tender, but price and selection of vendor justified in writing</td><td>N/A</td><td>TL/DTL</td></tr>
<tr><td>C</td><td>$5000-20000</td><td>Collect quotations in sealed envelopes</td><td>Opened by Norplan tender team (3 prs)</td><td>DTM/TM</td><td>DTM/TM</td></tr>
<tr><td>D</td><td>$20,000-$200,000</td><td>Advertised local tender</td><td>Opened by Norplan tender team (3 prs.)</td><td></td><td></td></tr>
<tr><td>E</td><td>$200,000 and above</td><td>Advertised International tender</td><td>Opened in tender meeting by Norplan Proc. Team. Procurement endorsed Norplan HQ. procurement committee.</td><td>Evaluation Proc. Team, and approved TM and NORPLAN proc. HQ.</td><td>TL</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Approval of specification</td><td>Prior to procurement and tender for all procurement except for category 1, product specification shall be prepared and presented to the TM and Client for approval/ endorsement prior to starting the procurement process.</td></tr>
</table>

	Specifications and procurements to be made should be presented and approved for procurement by TM and the Project coordinator in the PCU, and MRRD.
Procurement of items in Category A	The Project management team are free to proceed with local shopping of items necessary for running the local office and establishment as long as this is in line with the approved budget and project intensions. This will be issues such as petrol, servicing of cars and transport, air tickets, and minor equipment needed for the office of for payment of office support staff. PAYMENT Mode: Cash from Local office.
Procurement of items in Category B	Procurement require that TL or DTL visits three shops and view prices, notes prices and prepare written justification of shop selected. The lowest cost should selected unless justified otherwise. Procurement approved with TL before proceeding. PAYMENT Mode: Cash from Local office/ check
Procurement of items in Category C	Procurement checked in line with approved budgets. TL/ DTL collects written quotations based on written specifications from at least 3 suppliers. Envelopes opened in Norplan procurement team meeting (DTL/TL/SLNC) Procurement approved with TL before proceeding. PAYMENT Mode: Bank transfer by Norplan HQ.
Procurement of items in Category D	Procurement checked in line with approved budgets. Tender placed in local newspaper for local tender. Envelopes opened in Norplan procurement team meeting (DTL/TL/SLNC) Recommendation prepared and sent to Norplan HQ procurement dept. for approval. Procurement approved with TL before proceeding. PAYMENT Mode: Bank transfer by Norplan HQ.
Procurement of items in Category E	As for D but Tender placed in local and international papers. Envelopes opened in Norplan procurement team meeting (DTL/TL/SLNC) Recommendation prepared and sent to Norplan HQ procurement dept. for approval. Procurement approved with TL before proceeding. PAYMENT Mode: Bank transfer by Norplan HQ.

NORPLAN Kabul procurement team	.Deputy team leader Natibullah Abrar Senior Consultant: Prof : Hamid Team leader (Dr. Stoveland , in Kabul if procurement is over USD 100,000, otherwise tender meeting can be handled in skype meeting.)
NORPLAN HQ procurement team	.Norplan through Asplan Viak financial manager and accounts office Arendal, Norway with support from TL

TL = team leader
DTL deputy team leader
LSNC , Local Senior Norplan Consultant
OTHER Issues need description:
Procurement team: Kabul: TL; DTL, LSNC

15.5 Draft Training quantity matrix

Outline draft to training courses to be addessed for the training plan to be prepared early in the Planning Phase

	Main topic	Prupose of training	Focu group	Duration, days	# partic-ipants	# Courses	*Organised by*	Implemented by	Likely Location	Sum	Calculations: Persons trained	Training person days:	# days training
											899	**2733**	**97**
1	**Specialist training Hydrogeology**												
1.1		Implementation and interpretation of VES techniques	specialist geophysicist	4	10	2	*Norplan*	Intern. Expert	Kabul Univ.		20	80	4
1.2		Implementation and interpretation of IP techniques	specialist geophysicist	4	10	1	*Norplan*	Intern. Expert	Kabul Univ.		10	40	4
1.3		Geophysical borehole logging	specialist geophysicist	3	10	1	*Norplan*	Intern. Expert	Kabul Univ.		10	30	3
	Hydrogeology general										0	0	0
1.4		The hydrogeology in Adghanistan	Hydrogeologists/ students	5	30	2	*N*	Univ/poly	Kabul?		60	300	5
1.5		Alanlysing data and maps	Hydrogeologists/ students	5	30	2					60	300	5
1.6		Method for planning and implementing hydrogeological provincial surveys	Hydrogeologists/ Water engineers, Gov, consult students	4	30	2	*Norplan/ MRRD*		MRRD		60	240	4
1.7		Hydrogeological investigations and methods	hydrologists/eng/technicians?	4	30	2		External support	Univ.		60	240	4
1.8		Planning hydrogeological survey	National, hydrpg. Engineers	3	30	1	*Norplan*	MRRD /Dacaar	MRRD		30	90	3
1.9		Planning hydrogeologica survey	Prov: engineers, hydrogeo,	3	20	3	*Dacaar*	Dacaar	Dacaar		60	180	3
1.1		Planning hydrogeological survey	Hydrogeologists/ students	2	10	2	*Norplan/ Dacaar*		University		20	40	2
1.1		Planning hydrogeological survey	Hydrogeologists, technicians, drillers,	2	5	2	*Dacaar*		Prov		10	20	2
1.1		Use of slumberger sortware		2	5		*Dacaar*	Dacaar	Dacaar		0	0	2
1.1		Technicans course in data collection and curation for survey existing water sources	Eng technicians	2	20	1	*Dacaar*	Dacaar	Nat		20	40	2
1.1		Technicans course in data collection and curation for survey existing water sources	Eng technicians	2	20	2	*Dacaar*	Dacaar	Prov		40	80	2
1.2		Water sampling and basic field analysis	Eng/ chemists/ tech	5	10	1	*Norplan*	Norplan/Dacaar	MRRD		10	50	5
1.2		Water sampling and basic field analysis	Eng/ chemists/ tech	5	10	1	*Norplan*	DACAAR	Prov		10	50	5
1.2		Remote sensing techniques for monitolrng wells	Eng/ technicians	2	10	2	*Dacaar*	DACAAR	Nat/Prov		20	40	2
2	**Training methods**												0
2.1		Training of trainers methods		2	10	1	*Norplan/ norsk vann*	Dacaar			10	20	2
2.2		Best practice in preparing training material and training manuals	Traininers MRRD, NGOS, others	4	20	1	*Norplan/Norsk Vann*	Dacaar	Dacaar		20	80	4
												0	0
3	**GIS- MIS for sustainable dissemination of hydrogeological information**											0	0
3.1		Design of wells database		4	15	1	*Norplan*	DACAAR	MRRD		15	60	4
3.2		Design fo web-based hydrogeologocal atlas interphase	IT specialists, MRRD,	3	10	1	*Norplan*	Norpl/Dacaar	MRRD		10	30	3
3.3		Design and maintenance of project web page	IT specialists, MRRD, NGOs; programs	3	10	1	*Norplan*				10	30	3
3.4		Use ArcGIS software	IT specialists, MRRD, NGOs; programs	3	15	1	*Norplan*		Univ, Kabul		15	45	3
3.5		How to use hydrogeological /water use atlas for planing rural water supply interventions	Hydrogeologists/ Water engineers, Gov. planners, consult students	1	20	3	*Norplan*	Univ/Dacaar	Univ/Poly		60	60	1
4	**Water and sanitation plannig**												0
4.1		Planning water supply and sanitation projects useing water atlas	Prov: engineers, hydrogeo,	3	20	2	*Norplan*	Norplan/Dacaar	Prov		40	120	3
4.2		Conceptual design of water and sanitation services based on sustainability and affordability	Hydrogeologists/ Water engineers, Gov, consult students	3	20	2	*Norplan/*	Norpl/Daccar/Univ	Univ		40	120	3
4.3		Planning and implementation of O&M for rural water supplies	National, Prov: engineers, hydrogeo,	3	20	2	*Norplan*	MRRD/Dacaar	MRRD		40	120	3
4.4		Assessment of water technology to use in ground water areas with potential saline waters.	Hydrogeologists/ Water engineers, Gov, consult students	1	30	2	*Norplan*	Uni/Dacaar	Univ		60	60	1
4.5		Social aspects of Water and Sanitation, WASH policy	National, Prov: engineers, technitians	1	15	2	*Norplan/ MRRD*	Norplan/Dacaar	MRRD/ DACAAR		30	30	1
4.6		Water supply network design usinng watercad and epanet.	Water engineers, design, Gov, consult students	3	10	3	*Norplan*	Noplan	MRRD		30	90	3
4.7		Training in use of total station for water/wastew. Network surveys	Water engineers, design, MRRD	4	5	1	*Norplan*	DACAAR	MRRD		5	20	4
4.8		Project management using MS project	Project managers / planners Water engineers, , MRRD	2	7	2	*Norplan*	Norplan/Dacaar	MRRD		14	28	2
5	**University training in Hydrogeology for sustained Afghan expertise**										0	0	
5.1		Canditates in BS and MSc with Major in Hydro Geology	Afghan students, bonded to work in sector	one to five		18 months		by application					
5.2		Candidates for Ph.D in Hydrogeology	Afghan sepcialis hydrogeologist(s) can apply for scolarship	one or two		40 months		by application					

Revised, after comments from DB,

15.6 List of equipment and software:

Equipment and software

List of equipment and software

Sum	Sum	**347,975**

Hydrogeo equipment:

Equipment (DB specification)	No	USD
2 x Hanna HI 8733 Conductivity meters 2 x 381 GBP = 762 GBP = 1200 USD		1200
Calibration solutions		100
2 x Hanna HI 98509 Checktemp thermometer , 2 x 47 GBP		150
2 x 100 m dip tape, 2 x 680 GBP		2140
1 x 200 m level / temp / conductivity tape		2100
Analytical consumables (flasks, syringes, filters)		600
Purchase of water level / temperature divers (mostly for implementation phase)		
10 x Schlumberger CERA ceramic (saline water) divers @ 748.06 GBP		11807
5 x Schlumberger MINI divers @ 465.77 GBP		3670
6 x Schlumberger BARO divers @ 325.00 GBP		3078
4 x Schlumberger optical reading units @ 173.33 GBP		1094
Purchase of 10 x 50 m Schlumberger suspension cable @ 21,50 GBP		340
Purchase of 10 x 100 m Schlumberger suspension cable @ 39 GBP		616
Suggested additional geophysical borehole logging equipment purchase:		
Geovista portable geophysical borehole logging equipment, including motorised winch, logger unit, tripod and pulley, natural gamma, dual induction and fluid temperature conductivity sondes.		50000
Budget cost		

Allow maybe 700 GBP for software	1100
The need for further geophysical equipment, such as EM (Slingram or similar), 2D VES or Georadar will be assessed during the Planning phase.	???
Pump test equipment with generators, 2 sets	40000
Translation of technical manuals to DARI for:	4000
IRIS Syscal Manual (50 pages)	
WinSev software 4 Manual 15 pages	
Soil/Water specialist analysis in Norway/ NGU	
Analyses at NGU during Planning Phase, 6 IC / ICPMS water analyses @ 1200 NoK= 1320 USD	1320
8 soil analyses @ 1500 NoK = 2100 USD	1320
6 oxugen /hydrogen isotope analysis	2160
Soil samleanalysis in Kabul, 24, estimated	2500
Specialised / lisenced software; Hydrogeological investigations	
AQUACHEM from Schlumberger Water Services , - Government team licence 2040 USD	2040
HYDROGEOANALYST from Schlumberger Water Services (http://www.swstechnology.com/groundwater-software/groundwater-data-visualization/hydro-geoanalyst) Gov . Team lisence	7140
Specialised / licenced software /GIS	
GIS software, ArGIS 10, one licence for work station.	35000
Hardware and software for geo-database solution for web interphase	35000
(Possible hardware Atlas production),	20000

Drilling of training borewell	30000
Network survey equipment and software Total station	
Cost for procurement of total survey station for 3D including software	30000
Faster internet connection at MRRD/ RuWatSIP	
Communication equipment: Installation of faster internet connection so that regular skype meetings between Norway and Kabul is possible on regular basis. Afs 30000/month	2000
Satellite telehpones	
Purchase of satellite telephones (3 thorya) for security purposes.	3500
Software for Syscal Pro	
Software for Suscal Pro hydregeologica equipment in MRRD.	4000
Unspesified geophysical equipment	
To be assessed if needed for implementation phase	50000

15.8 List of training expenses for participants, and local resource personnel.

Training expenses, participants/ invited trainers

		Budget cost
Sum ex. Univertiverys grants	sum	**248,478**
Sum incl. Univerity grants	Sum	**348,478**

International Geophysicsist trainer

Geophysicist to provide hand-on training in VES and IP methods at location in Kabul and also to provide back-up interpretation of geophysical, 3 weeks prep. And 3 weeks training	40000
Travel expenses and allowances international trainer	7250

Hiring National trainers for courses

Assumed hiring for 50% of courses (96 days @ $200/day)	19200

Expenses for workshop participants

local travel reimbusement/ govt. Staff from Kabul or Maynane (@$10/d. Assume 40%	10580
20% Staying in hotel/ DSA $30	15870
20% hotel, participants, $50	26450
10% Senior staff/ lecturers hotel/DSA, $125	33063
Travelling costs to town out of town into town (USD 20 , 10%)	15750
Travelling costs to Maimane-Kabul, 10 workshops, 6 persons by air $300 return flight	18000

Field costs for drilling team

4 persons, field 100 days/ yr (USD20)	16000

Training course costs:

Food for course parcipants, @ 7/participant		17815
Handouts, stationary participants $5/participant/course		3500

Training course for total station, intrepretation

Training of trainers in total station use. (Local tiner to hired for a number of courses	one week	15000

Afghan hydrogeologists to attend international IAH Congress Summer 2012

4 hydrogeologist specialists		10000

Special university cources in Hygrogelolgy bonded Afghans eligble

Tentative costs/ grant to be applied for and budget line to be discussed when specific university cources are identified.

B.Sc. M.Sc. Support 19 months	1- to 5	50000
Ph.D scolarships (tentative)	1-2?	50000

15.9 CV Frank Haugan.

CURRICULUM VITAENAME: HAUGAN, Frank

BORN: 1966

PROFESSION: Geographer

YEARS WITH FIRM: 9

PROPOSED POSITION: N/A

NATIONALITY: Norwegian

key qualifications

Mr. Haugan is a senior consultant with 15 years of experience and his professional notable experience includes:

- Project Manager; Several national Spatial Data Infrastructure (SDI) projects (2006–ongoing), including strategic and implementation planning for the Agency for Public Management and eGovernment, the Norwegian State-owned Land and Forest Company, The Agency for Road and Transport, and the Transmission system operator of the Norwegian electric power system.

- Project Manager; "*Establishing Mapping Agency Palestine*" (2005-06). Managing, planning and developing implementation programs included budgeting. Based on international standards such as ISO and Open Geospatial Consortium and the concept of Spatial Data Infrastructure (SDI). Client: Ministry of Planning.

- Project Manager; "*Establishing a National Geographic Information System Authority for the Sultanate of Oman*" (2004-05). Managing, planning and designing a GIS Authority based on international standards and the work of ISO and Open Geospatial Consortium and the concept of Spatial Data Infrastructure (SDI). 20 entities involved, included 12 Ministries. Client: Ministry of National Economy.

- Business Analyst; "*Design and Implementation of GIS and GIS Integration*" (2003-04). Work included data modelling based on international standards such as ISO and Open Geospatial Consortium, training of personnel and organisational issues related to establishment of a GIS Centre. Client: Abu Dhabi Municipality and Town Planning Department in United Arab Emirates.

- Adviser at the Ministry of Planning and International Cooperation (1997-99) in Palestine. Planning approaches, management and organisational challenges related to implementation of GIS in Palestine. Responsible institutional building activities involving the two GIS/mapping units at the Ministry in Gaza and the West Bank. Client: Palestinian National Authority.

Currently, Haugan is involved in the harmonisation of spatial planning data according to the INSPIRE Directive and also the INSPIRE data specifications on utilities and governmental services. Furthermore, Haugan has hands-on experience in data modelling, 3D modelling, map design, cartography, statistical- and other scientific methods, and GIS.

In addition, Haugan is an advanced user on ESRI-products, including 3D Analyst, Spatial Analyst, and Network Analyst, and also construction of DEM's and use of ArcHydro modelling tools supporting water resources and management applications. He has considerable pedagogical skills and has taught cartography and GIS at intermediate- and masters' level and supervised Masters Degree students.

EXPERIENCE/NOTABLE ASSIGNMENTS:

2006 – **Asplan Viak AS – Norway** (Project manager / expert)
Various assignments in the Norwegian or European market, such as;

- Norwegian Aviation Company (AVINOR): Coordination, management and maintenance of engineering drawings in AutoCad on utility network at Trondheim airport. Furthermore, transformation into modular utility tools in ArcGIS and AVINORs centralised GIS database.
- EU Commission: Harmonisation of spatial planning data according to the INSPIRE Directive and INSPIRE data specifications on utilities and governmental services.
- The Agency for Road and Transport: GIS strategic and implementation planning
- The Transmission system operator of the Norwegian electric power system: GIS strategic and implementation planning
- Agency for Public Management and eGovernment (DIFI): Study describing the processes of access to property information and the obstacles finding and accessing the information. Thus, descriptions on juridical, organizational and technical conditions defining the access were essential in the assessments done
- Norwegian State-owned Land and Forest Company (Statskog SF): Various projects – (1) General consultancy services related to geodata – QA memos, strategies, documents, etc., (2) Cost-/benefit analysis – analysis on selected initiatives, (3) Planning of Spatial Data Infrastructure (SDI)
- Developing geodatabase with behaviour and topological tools in ArcGIS for capturing and storing reindeer data
- 3D modelling and visualisation assignments, building DEM's for various purposes such as road planning, housing studies, etc.
- Designing and building national, seamless datasets for the Norwegian Reindeer Management Directorate
- Assisting the Sor-Trondelag County Council in developing a regional plan on wind-power, assessing various thematic topics in relation to utilisation of wind as a source for power
- Development of DTM's and use of ArcHydro to perform spatial analyses on water related issues
- Construction of municipality -and directive plans
- Conducting specialised GIS-related courses, data conversion and preparation
- Analyses on bicycle -and road networks utilising own developed application (Area and Transportation Modelling – ATP)
- Establishment and follow-up of internet based registration and procedures supervising day-care places for the Ministry of Family and Children

2008 **Norplan AS – Abu Dhabi – United Arab Emirates** (Mapping/Surveying Specialist)

Coordinating, planning and designing an Addressing System for Abu Dhabi Municipality. Work conducted so far is related to review of existing system and conceptual design. Next phases are detailed design, tendering and supervision of implementation.

Client: Town Planning Department – 2 man-months

2005 – 2006 **Norplan AS – Palestine** (Project Manager)
Coordinating, planning and designing a National Mapping Agency in Palestine. Managing, planning and developing implementation programs for Mapping Agency Palestine (MAP). Based on international standards and the concept of Spatial Data Infrastructure.
Client: Ministry of Planning – 6 man-months

2004 – 2005 **Norplan AS, Muscat – Sultanate of Oman** (Project Manager)

Coordinating, planning and designing a National GIS Authority for Sultanate of Oman, emphasizing on establishing a Spatial Data Infrastructure (SDI) and an interoperable solution. In this project interoperability is understood as the ability of government organizations to share and integrate geographic information by use of common standards based on ISO and Open Geospatial Consortium. *Client: Ministry of National Economy – 8 man-months*

2003 – 2004 **Norplan AS, Abu Dhabi – United Arab Emirates** (Business/GIS Analyst)
Planning, design and supervision of implementation of the GIS system and applications for Abu Dhabi Municipality and Town Planning Department, in cooperation with Principal Systems Analyst and Client representatives, with special responsibility for human resources and educational issues. All design is based on international standards (ISO and Open Geospatial Consortium).
Client: Abu Dhabi Municipality and Town Planning Department – 14 man-months

2002 **Norwegian University of Technology and Science (**Assistant Professor)

Teaching cartography and GIS at intermediate- and masters level at the Department of Geography, and supervising Masters Degree students.

2001 – 2002 **Nord-Trøndelag University College** (Assistant Professor)

Assistant Professor at Faculty of Social Sciences and Natural Resources. Establishment of extensive studies in GIS and cartography on the Internet. Lecturing in cartography and geographical information systems. Advisory services to researchers in use of GIS in practical work situations. Implementing new mapping technology at the University College. Includes ArcGIS 8 (ArcView, ArcEditor and ArcInfo). Also introducing ArcSDE, extensions 3D Analyst, Spatial Analyst and Network Analyst, and ArcPad/PDA solutions.

1999 – 2001 **eMap AS – Norway** (GIS specialist/founder of company)

Established January 1st 2000, with infrastructure and production facilities. Work included lecturing, marketing, and production line set-up, use of GIS-software and production of maps. Responsible for development of routines related to planning and implementation of GIS with main focus on organisational issues. Advisory services to the Directorate of Nature Management and writing of manual describing guidelines for mapping and structuring of biodiversity data. Guidelines for production of maps were described. Lecturing cartography

and GIS at college and universities. Extensive courses in practical use of GIS given at the County Governor's office.

1999 **Fjellanger Widerøe Kart AS – Norway (Geographer / GIS specialist)**

Advanced use of GIS-technology in production of data for the Norwegian telecom company (Telenor) using Microstation, GeoMedia and ArcView Spatial Analyst. Map production and use of GIS-software for various assignments. Lecturing cartography and GIS at college and universities.

1997 – 1999 **NORCONSULT INT. /Fjellanger Widerøe AS – Palestine** (Advisor)

Managing GIS and computer-assisted mapping and planning in the Physical Planning and Institution Building Project, a project conducted by the Ministry of Planning and International Cooperation through the Palestinian National Authority. Responsible for production line set-up and supervision, introducing GIS-software and map production and use of multi-purpose maps, and lecturing. The last part of the project included supervision of the establishment of a "planning-GIS" in Palestine.
Client: Palestinian National Authority – 25 man-months

1996 **Chief Administrative Officer of Sor-Trøndelag County – Norway** (Consultant)

Establishment of GIS in the Section of Agriculture, digitising and map production using Arc/Info and ArcView.

1993 – 1996 **Norwegian University of Science and Technology**
Various assignments. Most relevant: Preparation, organisation, and design of a Digital Terrain Model over the Pangani Basin in Tanzania. In 1994, a 7 months fieldwork in Sri Lanka was accomplished investigating the use of maps and GIS as tools in management of irrigation systems. Various publications can be provided.

countires of work experience:

Kyrgyzstan, Palestine, Sri Lanka, Oman, United Arab Emirates, Norway

education and selected courses:

1996 - Various courses:

Safe software – FME Desktop (2 days – 2009)

Norwegian Mapping Authority – GML and XML course (2 days – 2008)

ESRI – Arc/Info, AML and data management (one week – 1998)

1996 Norwegian University of Science and Technology:

"Cand.polit." (**M.Sc./ph.D**) in Geography, emphasising on planning and GIS. Post-graduate thesis: *Maps and GIS as Appropriate Technology in Management of Irrigation Systems? Case study: Mahaweli River, System C – Sri Lanka.*

1994 University of Trondheim:

"Cand.mag."(**B.Sc./M.Sc.**) in Geography, emphasising scientific methods, statistical approaches, cartography and remote sensing, geography and history.

MEMBERSHIPS:

The Norwegian Geographical Society

The Federation of Norwegian Professional Associations

EMPLOYMENT RECORD:

2004- to date	**Asplan Viak AS** **Trondheim – Norway**	Senior Consultant, Geomatics
2003-05	**NORPLAN AS** **Abu Dhabi – United Arab Emirates**	Project Manager / Business Analyst
2002-03	**Norwegian University of Science and Technology** **Trondheim – Norway.**	Assistant Professor
2001-03	**Nord-Trøndelag University College** **Steinkjer – Norway**	Assistant Professor
1999-01	**eMap AS** **Trondheim – Norway**	GIS Specialist (owner of Company)
1996-99	**Fjellanger Widerøe AS / Norconsult AS** **Trondheim – Norway**	GIS Specialist / Advisor
1996	**Chief Administrative Officer of Sor-Trøndelag County** **Trondheim – Norway**	Consultant

PUBLICATIONS:

Haugan, F. 1998. *Reorganising Management: Map Use and Geographical Information Systems (GIS) – Keys in Managing Canal Irrigation.* TROPECOL papers, 1998,3.

Haugan, F. 1996. *Bruk av kart og GIS som verktøy i forvaltninga av irrigasjonssystem. En studie fra System C, Sri Lanka.* NTNU.

LANGUAGES:

	Speaking	**Reading**	**Writing**
Norwegian	Mother tongue		
English	Excellent	Excellent	Excellent
German	Fair	Fair	Poor

CERTIFICATION:

I, the undersigned certify that, to the best of my knowledge and belief, this Curriculum Vitae correctly describes myself, my qualifications and experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if employed.

Date of signing:

Signature: