

Small modifications made, regarding water sampling, shown by yellow shading.

The purpose of this survey is to provide information on how the flow and chemistry of the main rivers change along their length. This, in turn, provides information regarding groundwater recharge processes.

The survey should be timed such that the rivers are not in flood and yet such that there is discernible flow along the majority of the length of the rivers. Provisionally, we have suggested that April/May 2013 may be the optimal time for this, although this should also be verified by local information.

The surveys should be carried out along 2 reaches of river:

- 1) the course of Shirin Tagab River through Shirin Tagab and Dowlatabad Districts, from around Sar-e-Qala (36.106 64.855) to around 10 km north of Pata Taba (c. 36.688 64.900). This represents a profile of around 70 km
- 2) the course of Maimana River from Maimana city through Shirin Tagab district to Jalaier Chokazi. This represents of profile of around 70 km.

### **River Stations**

The team(s) will drive downstream along the course of the two rivers and will stop every c. 5 km (this will depend on access and security: the exact distance is not critical) to record the river profile. I.e. around 15 River Stations per river (30 River Stations in total).

The team should visit the District Governor and/or the representative of PRRD, at the start of the survey to ask permission to commence survey. **During the survey any springs or karezes encountered should be recorded.**

At each River Station (every 5 km), record:

- GPS location (digital latitude and longitude), and mark manually on map
- Village and district name
- Take at least two digital photographs of the river channel (upstream and downstream views), and record date and time of photo.
- Describe the river at this point – single deep channel, many shallow channels etc.
- Estimate width of flowing river channel and its depth at the centre of the channel
- Use floating objects to record velocity of water in centre of channel (m/s)
- Estimate flow rate of river
- Record water temperature, electrical conductivity and pH, using field meters.
- Record any use of the river water (human drinking water, livestock, irrigation)
- Record land use in area.
- Record any major changes in flow since the previous (upstream) station
- Take water samples, as indicated below

## Water sampling

At every second River Station (i.e. every 10 km):

- take a 500 mL (unfiltered) water sample for analysis at DACAAR (8 samples per river: 16 samples total). Mark this sample with the suffix “U”.
- 1 x 100 mL plastic flask of filtered water for chemical analysis in Norway (using syringe and disposable filter capsule, according to protocol ***Water samples for chemical analysis in BGS (England)*** in the document *Water sampling methodologies.doc*). Mark this sample with the suffix “F”.

At 4 of these locations, a second, filtered duplicate 100 mL sample should be taken for analysis at BGS (England)

At every fourth location (i.e. every 15-20 km), additional water samples will be taken for isotope analysis at **BGS, UK** (i.e. 4 samples per river – at the start and end of the profile and at two intermediate points - 8 samples total).

- Because most river waters will contain a lot of particles, we recommend that you collect **two** 100 mL flasks of water for isotopic analysis: 1 x 100 mL plastic flask of filtered water (using syringe and disposable filter capsule) *and* 1 x 100 mL plastic flask of unfiltered water, according to protocol ***Water samples for isotopic analysis at BGS (England)*** [Step 26] in the document *Water sampling methodologies.doc*. Mark these samples with the suffixes “FIs” and “UIs”.

Note: all water samples should have a unique number, which should be recorded in waterproof pen on the bottle and recorded on the field sheet. For example:

NOR-GW-01 F

(NOR = NORPLAN, GW = Gurziwan district, 01 = sequential number)

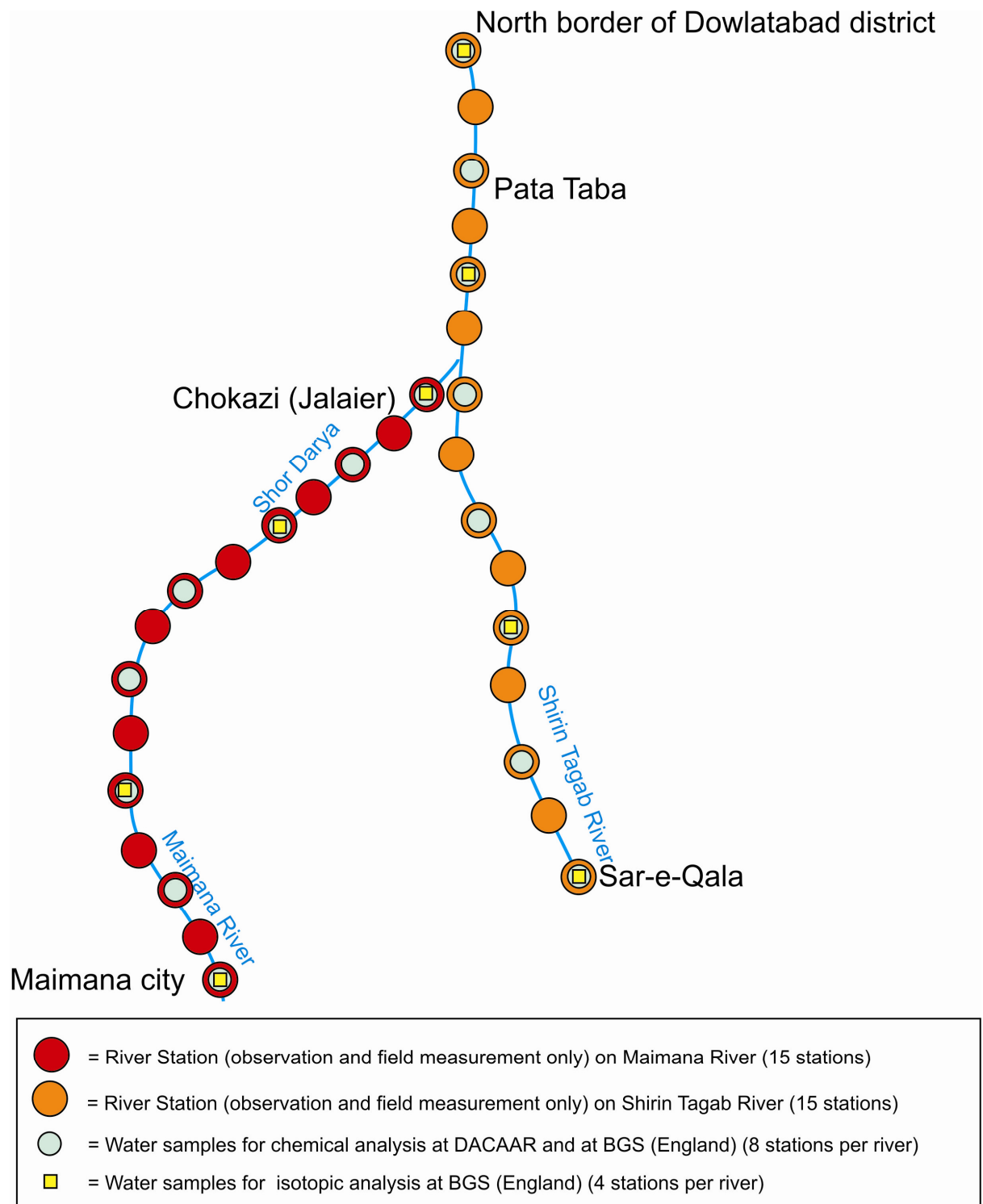
This should be followed by one of the following suffixes

U = unfiltered


F = filtered

UIs = unfiltered, for isotope analysis


FIs = filtered, for isotope analysis



**LOCATION RECORDING SHEET FOR EACH RIVER STATION (EVERY c. 5-6 km)**

<b>NORPLAN</b> 		<b>RIVER PROFILE SURVEY 2013</b>	
		<b>FARYAB PROVINCE</b>	
River name:			
District:	Village:	Location name (if any):	
Latitude/longitude (decimal):			
Approx. Elevation (m asl)	m above sea level (from GPS)		
Use of river:	e.g. human potable water supply, livestock, irrigation		
Surrounding land use:	e.g. urban, irrigated land, semi-desert		
Number of photographs			
Camera reference			
Date and time of photographs			
Description of river channel	e.g. single deep channel, multiple channels		
Width of flowing river channel (m)			
Depth at centre of channel (cm)			
Estimated flow velocity at centre of channel	_____ metres in _____ seconds		
Estimate of flow rate (m <sup>3</sup> /s)			
Basis for estimate			
Any major change in flow since last locality?			
Appearance of water			
<b>Field analysis</b>			
pH	EC	Temperature	
	µS/cm	°C	
Water sample no.			
500 mL unfiltered for analysis at DACAAR "U"	100 ml filtered sample for chemical analysis in England "F"	100 ml unfiltered for isotope analysis in England "Uis"	100 ml filtered for isotope analysis in England "Fis"
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recorded by:	Date:	Time:	
Name:			

**LOCATION RECORDING SHEET FOR ANY SPRINGS / KAREZES ENCOUNTERED**

<b>NORPLAN</b> 		<b>RAPID FIELD ASSESSMENT 2012</b>	
		<b>FARYAB PROVINCE</b>	
Type of feature: Spring <input type="checkbox"/> Dug well <input type="checkbox"/> Drilled well <input type="checkbox"/> Karez <input type="checkbox"/>			
District:	Village:	Well or spring name:	
Latitude/longitude (decimal):			
Approx. Elevation (m asl)	m above sea level (from GPS)		
<i>(If karez, give reference of karez mouth and mark course of karez on sketch map)</i>			
Use:	Public supply <input type="checkbox"/> Private supply <input type="checkbox"/> Institution (e.g. school or clinic) <input type="checkbox"/> Irrigation <input type="checkbox"/> Other:		
Type of pump:	Hand pump <input type="checkbox"/> Electric submersible <input type="checkbox"/> Bucket <input type="checkbox"/> Other:		
If karez or spring, estimated flow rate		L/s	
Diameter of well:		mm	
Height of well top (flange) above ground level		cm above / below ground level	
Casing material:			
Date of construction:			
Driller:			
NGO / implementing partner:			
Donor:			
<b>Water appearance of water</b>			
Visual:	Taste:	Odour	
<b>Field analysis (after 5 minutes pumping)</b>			
pH	EC	Temperature	DO or Eh
	µS/cm	°C	mg/L or mV
Water sample no.			
500 mL for unfiltered for analysis at DACAAR <input type="checkbox"/>	100 ml filtered sample for chemical analysis in England <input type="checkbox"/>	100 ml unfiltered for isotope analysis in England <input type="checkbox"/>	
Static water level		m below well top	
Total depth		m below well top	
Is the well working as intended? Yes <input type="checkbox"/> No <input type="checkbox"/>			
If No, describe problem			
Is there a community association managing the well? Yes <input type="checkbox"/> No <input type="checkbox"/>			
If Yes, provide details			
Recorded by:	Date:	Time:	
Name:			