

Terms of Reference for Ground Water Mapping in Rwanda

Summary

Title	Ground Water Mapping in the <i>Eastern Province and Amayaga Region of the Southern Province of Rwanda</i> ¹
Purpose	To provide technical services for groundwater mapping in the Eastern Province and development of a <i>road map for groundwater governance for resilience</i> .
Type of consultancy:	Delivery based
Location	Kigali, with field work in Eastern and Southern Province
Duration	Nine (9) months
Start Date	15 November 2021
Reporting to	Chief WASH

1. Background

Rwanda is not so much arid country, with annual rainfall total varying from 900mm to 1600mm per year. However, drought and climate related food insecurity are more recurrent toward the eastern part of the country and in the Amayaga region of the Southern Province. In 2016, drought affected Rwanda's Eastern Province, especially Kayonza, Kirehe, and Nyagatare districts, leaving 44,000 poor households (some 225,000 people) food insecure. From the Congo Nile divide toward the east, altitude varies from more than 4000 metres to nearly 1300 metres above mean sea level, with almost linear reduction of rainfall. Although the driest region, the Eastern part has the highest share of arable land and almost the most abundant source of surface water and groundwater, yet this part is also characterized by recurrent water scarcity due to the lack of springs and other sources of water in the region.

The Eastern Province of Rwanda faces annual rainfall about 25% less than other areas of the country (600 – 800 mm/year). Due to population increase partly by newly resettled residents, accessibility to water is lower than other provinces. Therefore, residents who cannot procure safe water must rely on unsanitary surface water and stagnant water for their domestic use which can have inferior effects on their health such as diarrhoea and other waterborne diseases. The actual average access to safe water rate of Eastern Province is estimated to be lower than 50%. Sustainable water resources in the study area are mainly groundwater. Furthermore, based on future climate change projections, most of the Eastern province is likely to be water deficit by 2030. These facts are making the Eastern Province special in regard to drinking water as well as agriculture water management. Moreover, even though the province experiences recurrent water scarcity, the Eastern province also has the largest concentrations of groundwater exploitation activities mainly for domestic and livestock use. Recently with the development of small-scale irrigation some groundwater use for irrigation has been observed.

Amayaga region is composed of four districts, including Kamonyi, Ruhango, Nyanza and Gisagara. The residents of these districts state that their region covered large patches of natural and planted forests rich in plants and home to a variety of animal and bird species. These forests hold carbon stocks and provide critical watershed services to the agricultural landscapes surrounding them. The degradation of biodiversity in this region has brought many consequences, including soil erosion and land degradation, resulting in decreased agricultural productivity, endangerment or disappearance of some fauna and flora species. The alarming level of threat to biodiversity and to the Amayaga region inhabitants prompted the Government of Rwanda to work with partners to adopt stringent mechanisms, including the establishment of an ambitious initiative aiming at restoring forest landscape of Amayaga region and improve the livelihood of its inhabitants and create green jobs. However, these objectives can be reached only if water resources are available.

With severe climate fluctuations linked to global climate change, the Amayaga region has experienced significant reduction in rainfall and increase in evaporation and evapotranspiration in the region, which increased the surface water depletion. Despite the great improvement in enhancing access to safe water,

¹ Priority districts include Kirehe, Ngoma and Bugesera

42% of household still walk more than 15 minutes to access improved water in the Southern province. The Southern Province is second to last in the ranking of access to drinking water, just ahead of the Eastern province. The latter has 50% of the households who walk more than 15 minutes to access the drinking water point.² The lack of adequate access to safe drinking water supply results in children suffering from malnutrition and stunting, and falling ill from waterborne illnesses.

As the trend of demand for groundwater exploration steepens in Eastern Province and the Amayaga region, the demand for safer and more reliable sources of water is increasing. Especially water kiosks and city water supply prefer groundwater to surface to avoid the challenge of pollution from sediments and large fluctuation of surface water between rainfall seasons.

The development expected in the Eastern province as the new breadbasket area, and a new internal emigration destination, will exacerbate the need for groundwater governance, yet the resource is poorly studied. There is converging evidence in Rwanda, like other parts of the world with complex topography and geology, that groundwater varies significantly and is quite unpredictable even for small study areas.

2. Justification

Groundwater plays a vital role of natural storage for rivers, springs and plays a vital role in the hydrological cycle; in ecosystems and human life; in the ways it is exploited and used; and in the challenges of its proper and sustainable management. Despite the effort of the former Rwanda Water and Forestry Authority and the current Rwanda Water Resources Board³, considerable information gaps remain with regard to ground water resources.

Given the critical need for groundwater exploration and exploitation in the Eastern part of Rwanda, where water is needed mainly for human consumption and cattle and with current information indicating transmissivity and yields in the range of 1–6 m³ h⁻¹ (Malesu et al., 2010: Irrigation Master Plan, 2010-2020)⁴.

In this context, Rwanda Water Board, Government of Rwanda, with support from UNICEF, plans to engage a consulting firm (hereafter referred to as consultant) to undertake groundwater mapping in the Eastern Province and *Amayaga Region of Rwanda* and develop a *road map for sustainable and effective groundwater development and governance*. Data from this work will also be used to build strong justification for financial support from other development partners and hence catalyze development of infrastructure to make underground water resources available to vulnerable children and their families.

3. Objectives

The **overall objective** of this assignment is to contribute to sustainable management of ground water resources in Rwanda, particularly in the Eastern province and *Amayaga Region of Rwanda* through:

- (i) *Assessment⁵ and mapping of groundwater resources (for both shallow and deep) in the Eastern Province and Amayaga Region of the Southern Province*. This would, inter-alia, include assessment of ground water potential, groundwater vulnerability to contamination, and climate change for drought prone areas of Eastern Province and Amayaga Region of the Southern Province (hereafter referred to as the area);
- (ii) *Creation of an inventory of aquifers by location; geometric, lithological and stratigraphic characteristics; type (unconfined or confined) and their permeability⁶;*

² National Institute of Statistics of Rwanda (NISR), EICV5_Uilities and Amenities Thematic Report, December 2018

³ Please refer to the Report on Groundwater Storage and Enhancement in the Eastern Province of Rwanda available at

<https://waterportal.rwb.rw/sites/default/files/2019-07/Groundwater%20recharge%20and%20storage%20enhancement%20in%20eastern%20province%20of%20Rwanda1.pdf>

⁴ Malesu, M. M., Oduor, A. R., Chrogony, K., Nyolei, D., Gachene, C. K. K., Biamah, E. K., ... & Mogoi, J. (2010). Rwanda irrigation master plan. Nairobi, Kenya: The Government of Rwanda, Ministry of agriculture and animal resources, Ebony Company Limited and World Agro-forestry Centre (ICRAF).

⁵ The assessment will build on the 2018 study to ensure that there is no duplication/overlap – see footnote no. 2 above

⁶ This should be build on the work undertaken as part of 2018 study.

- (iii) Capacity building of Rwanda Water Resources Board and key stakeholders on the use of geospatial approach to map groundwater; and
- (iv) Preparation of a road map for effective groundwater governance for resilience in Rwanda *and a readiness funding proposal for Green Climate Fund to mobilise resources for implementation of the masterplan*.

The expected outcomes from the consultancy work are:

- (i) Effective planning and management of groundwater resources in Rwanda, based on groundwater potential and vulnerability maps developed above;
- (ii) Enhanced capacity of Rwanda Water Resources Board and national stakeholders' development of thematic maps from remote sensing products and integration with existing geological, hydrological, and borehole information to derive groundwater occurrence maps;
- (iii) Increased rate of successful drilling and hence improved access to water and programme efficiency, ultimately decreasing costs and allowing Government to deliver water services at scale;
- (iv) Strengthened community resilience to the impacts of climate change through improved access to safe water to children and their families, even during droughts.

4. Description of the assignment/specific tasks

The assignment will entail assessment of the availability of groundwater, depth of potential aquifers, possible yields and water quality, in addition to recommending the optimum sites for long-term production boreholes. It will build on the related study carried out by Government of Rwanda in 2019 (report available at <https://waterportal.rwb.rw/sites/default/files/2019-07/Groundwater%20recharge%20and%20storage%20enhancement%20in%20eastern%20province%20of%20Rwanda1.pdf>) as well as other similar studies.

Below are the details of activities/tasks and deliverables to be completed in line with the objectives of the consultancy:

4.1. Desk study and preparation of inception report

Gather and collate background information available (available maps, documents, reports, hydrometeorological data, well data, water quality data, geological settings, demographic data, etc.). Other activities under this task will include:

- (a) Development of conceptual hydrogeological models to complement data scarcity;
- (b) Preparations of field survey and investigation plans and base maps;
- (c) Development of demographic maps for each cluster (1:1,000,000);
- (d) Drafting inception report detailing proposed methodology and final work plan for the assignment;
- (e) Presenting to Rwanda Water resources Board, UNICEF and other stakeholders the draft inception report for review; and
- (f) Submitting the final inception report.

4.2. Remote sensing and overlay analysis to develop groundwater potential map

- (i) Processing the data provided by EU-JRC (or other source) and remote sensing analysis;
- (ii) Use GIS overlay analysis tool to combine remote sensing layers into one layer to display groundwater potential, and refine target areas, by using information from secondary factors;
- (iii) Combine the thematic maps in an overlay analysis (applying expert weighting) to produce a map displaying estimated probabilities of groundwater occurrence. This is a consultative process that requires inputs from an expert panel composed of senior groundwater professionals in Rwanda. In consultation with Rwanda Water Resources Board and UNICEF, organize a workshop with the senior professionals from the groundwater sector to agree on weighting parameters and conduct "expert weighting" and to validate overlay analysis and weighting criteria. The selection of the members of the expert panel will be done in consultation with Rwanda Water Resources Board and UNICEF;
- (iv) Select target areas per cluster with a high groundwater potential and close to priority population targets where high yield boreholes can be developed later. Selection of the target areas will be done in consultation with Rwanda Water Resources Board. UNICEF will mobilise relevant

stakeholders whose inputs will be key in selecting target areas and will meet the cost of organizing the consultation forums;

- (v) Carry out field visits to the target areas to ground-truth the information obtained from the input layers and the results from the overlay analysis. The ground-truthing work will among others include:
 - (a) Checking target areas presented in Cluster groundwater potential maps with general ground conditions;
 - (b) Observations on the geomorphological settings;
 - (c) GPS readings and map verifications;
 - (d) Water point survey and mapping;
 - (e) Geological and hydrogeological observations;
 - (f) Identification of limitations in the groundwater potential map outputs; and
 - (g) Identification of target priority areas for immediate interventions (drilling of wells)
- (vi) Following the ground-truthing works and population targeting, select potential test well sites for detailed studies;
- (vii) Develop conceptual models (hydrogeological cross-sections) of the clusters for a better understanding of the deep groundwater system and the remote sensing and overlay analysis outputs;
- (viii) Submit a final report per priority cluster detailing groundwater potential maps for the area (1:100,000) with ground-truthed analysis of drilling potential; and
- (ix) Organize a workshop/webinar for dissemination the groundwater potential resources from the mapping exercise and results among the main stakeholders.

4.3. Site specific hydrogeological and geophysical field surveys to verify the potential drilling sites for deep wells

- (i) Hydrological study to characterise rivers within or adjacent to the detailed study areas and assess recharge possibilities, accounting for all factors influencing the catchment area, existence of springs at regional and local scales and their hydrogeological implications, surface and groundwater relationships.
- (ii) Geological investigation on the following in the detailed study areas:
 - Classification of all the rock types and establishment of the stratigraphic relations of lithostratigraphic units.
 - Determination of the lateral and vertical extent of lithostratigraphic units.
 - Identification and mapping of all geological structures.
 - Determination of the major structures having important hydrogeological implications (faults, dykes, etc.).
 - Preparation of geological sections along zones of likely high groundwater flow paths.
 - Close observation on the texture, cementation, porosity and general lithostratigraphy of the geological formations at the local sites (geological characterization).
 - Mapping of the protective function of the overlying layers through (a) revisiting lithology map of the area from previous studies. (b) revisiting soil pattern map of the area from previous studies, and updating the land use of areas using latest high-resolution imagery (provided by RWB).
 - Mapping of the concentration flow and ground water resources through (a) revisiting the geological maps of the area from previous studies, (b) assessing through modelling the current natural recharge using soil moisture budgeting techniques, water budgeting or permeability, thickness of the superficial deposits and/or numerical models (e.g. Modflow), (c) compiling georeferenced data of yield, piezometric head and ground water depth; and (d) mapping of the yield, piezometric head and ground water depth mapping using observation point and geo-statistical methods.
 - Mapping of groundwater vulnerability based on hydrogeological typology of Vulnerability commonly used.
 - Other activities which may be required for comprehensive geological investigations.

(iii) Hydrogeological study:

- Inventory of springs, wells and all boreholes and recording their GPS coordinates and codes.
- Develop a mathematical model to predict seasonal and annual groundwater recharge for the selected aquifers/regions. This involves analysis of long-term records of precipitation, runoff, evapotranspiration and groundwater (well) datasets to develop a mathematical model to predict groundwater recharge rates in each of the selected aquifers and will help to assess the long term sustainability of the boreholes and other relevant water management infrastructures in the study areas.
- Identify major aquifers, define their extent based on the available data and field inspection combined with the geological data.
- Make a full analysis on the direction of flow, water exchange between rivers and groundwater, and specific problems such are drought in the eastern region
- Hydrological/hydrogeological observations and measurements: water levels (groundwater level observations), discharge measurements where applicable.
- Close observations on the geomorphology, land use, vegetation, and geological structures.
- Observations and mapping of groundwater manifestation horizons like seepage zones, springs etc. and groundwater flow directions.
- Assessment/evaluations on recharge conditions for the area for its sustainable utilizations.
- Regional view and understanding of the groundwater system of the local area.
- Estimation of the hydraulic properties of the aquifer.
- Other basic data/parameters that may be revealed during the study.
- Identifications of target areas by the help of the above information for geophysical investigation work to supplement the hydrogeological analysis.
- Map and verify hydrogeological boundaries and units (hydrogeological mapping at 1:100,000).
- Characterize the intra and inter annual groundwater recharge dynamics under the current and predicted effects of climate change (time horizontal need to be discussed). This task involves analysis of the groundwater simulation results to quantify intra and inter annual changes in groundwater recharge under the current and projected climate change scenarios.
- Assess the temporal changes in groundwater levels under current and future climate change scenarios under the current and predicted effects of climate change (time horizontal need to be discussed). This task involves analysis of the groundwater simulation results to understand the temporal dynamics of groundwater levels at each project site under the current and projected climate change scenarios.

(iv) Geophysical study:

- Within each of the detailed study areas the consultant will carry out a geophysical survey;
- As a first step, previous geophysical surveys conducted in the area (*if available*) should be reviewed;
- For each target area, the Contractor will realise 3-5 geophysical surveys;
- For each geophysical survey, the Contractor will produce 10 geoelectric tomographs;
- For each target area the geophysical survey will identify an optimal sites for drilling boreholes;
- Map the results of the geophysical survey (1:1,000); and
- The consultant should recommend the appropriate type of drilling technology to be used in each site.

(v) Water quality study:

- Assess water quality from strategic sampling from the springs and existing boreholes to compliment the data.

- Identify ground water pollution sources using available spatial information and additional analysis, where required.

(vi) Preparation of the final report with all the field studies.

4.4. Knowledge Management and Capacity building

- A 5-day training workshop for 10 participants (drawing participants from Government, NGO partners and other relevant stakeholders) to explain the steps of groundwater mapping, the interpretation of the remote sensing overlays, the weighting process for the different layers and the final interpretation of the maps for targeting well prospects, integrating borehole and surface geophysical information;
- Hands-on training of at least 10 national government staff to ensure that the remote sensing work and overlay analysis can continue in the country after the end of the consultancy assignment through providing hands on training to the staff of Rwanda Water Resources Board. This training will entail the steps of groundwater mapping, the interpretation of the remote sensing overlays, the weighting process for the different layers and the final interpretation of the maps for targeting well prospects, integrating borehole and surface geophysical information. It will also cover basics of groundwater modeling, three-dimensional model setup, and analysis of the simulation results (groundwater recharge current and future scenarios). The consultant will provide all material and software for the training;
- In consultation with the Rwanda Water Resources Board and UNICEF, develop a web-based repository for the mapping products (suitability maps, geological maps, socio-economic and water demand maps, demographic maps etc.). Details of the repository in terms of where it will be hosted, and its structure will be agreed upon during the inception meeting with Rwanda Water Resources Board; and
- Prepare technical field note⁷ to document the experiences of this assignment.

4.5. Road map for ground water governance and funding proposal

- Prepare a road map for strengthened ground water governance for resilience in Rwanda; and
- Prepare a funding proposal for readiness support for GCF for further studies on ground water and capacity building for strengthening ground water governance in Rwanda.

5. Key deliverables and timelines-ANNEX 1

Activity	Deliverables	Timeline	Schedule of Payment
TASK 1	Inception report detailing proposed methodology and final work plan for the assignment.	One month	10% payment upon receipt of final deliverable
TASK2	Validated report with identification of potential sites and submission of groundwater potential maps at 1:100,000 for each sub-national area of each Cluster.	Three months	30% payment upon receipt of final deliverable
	Minutes of dissemination workshop of the groundwater resources mapping exercise and results among the main WASH stakeholders.		

⁷ To document the methodology, process, experiences and lessons learned. Template to be provided by UNICEF.

TASK 3	Final Report for detailing field studies, geophysical (at 1:1,000) and hydrogeological maps (at 1:100,000), and identification of high yielded drilling sites.	Two months	30% payment upon receipt of final deliverable
TASK 4	Delivery of the web-based repository	Two months	5% payment upon receipt of final deliverable
	Report of training workshop to governments, NGO partners and other relevant stakeholders		
	Technica field note		
TASK 5	Road map for ground water governance and the funding proposal	To be submitted simultaneously with the deliverable for TASK 3	20% payment upon receipt of final deliverable
Retention Payment	Final approval by Rwanda Water Resources Board and UNICEF (one months after completion of all Contactor's activities).	One month	5% payment upon receipt of final deliverable

The consultant will collaborate with Rwanda Water Resources Board, Ministry of Infrastructure, REMA and other government institutions as well as sector partners to collect necessary data and information to deliver on the above listed outputs.

The consultant will submit brief monthly progress updates to Rwanda Water Resources Board/UNICEF/Ministry of Infrastructure along with completed deliverables listed above as per agreed timelines.

6. Reporting Requirements

Please refer to section 5 “expected deliverables” for the reporting requirements.

7. Project Management

The Consultant will be contracted by, and report to UNICEF Rwanda. In addition, the consultant will report to Rwanda Water Resources Board, the lead agency for Water Resources Management.

8. Location and duration

Though some tasks under this study may be carried out remotely, most of the field work will be carried out in Rwanda. In this context, the key technical team members will have to work within the country to undertake field visits/work, meeting with partners and workshop facilitation.

9. Payment Schedule

Payment will be made to the consultant as per scheduled presented in Section 5.

10. Qualifications

The following minimum requirements are necessary for a successful bid:

- (i) Legal entity/consortium of legal entities;
- (ii) At least 10 years of demonstrated experience of managing and implementing ground water exploration projects;
- (iii) Experience of working in African countries, especially in Rwanda.

The Consultant should propose a suitable team, including team leader and relevant experts including GIS Expert, Geophysicist and database/web applications expert. The proposed team leader should possess a Masters' degree in Geology, Hydrogeology or a related field and at least 10 years of relevant professional experience. The other team members should possess a Masters' degree in remote sensing and GIS, and

at least 8 years of relevant professional experience. The Team Leader role may be assigned to one of the proposed technical experts.

11. Evaluation Methodology

- a. Technical Proposal: The consultants should submit a Technical Proposal that should include, but not limited to:
 - (i) Firm's registration certificate;
 - (ii) Two latest audit reports;
 - (iii) Financial details including annual turn-over (in US Dollars) for the past 3 years;
 - (iv) Firm's organization and experience (including title of the assignment, name of the client, year and duration, scope of the assignment, outcome of the assignment, and reference/contact persons name, email and telephone);
 - (v) Comments and suggestions on the terms of reference;
 - (vi) Methodology and work plan for performing the assignment;
 - (vii) Team Composition and task assignments;
 - (viii) CVs for proposed professional staff (name, date of birth, years with the firm, total years of experience, nature of experience in this firm and others, education/other trainings and knowledge of local languages);
 - (ix) Time schedule for professional staff;
 - (x) Activity (work schedule);
 - (xi) Any dependencies or assumptions; and
 - (xii) Copies of at least two reports or samples of previous tasks like these under these terms of reference undertaken by the consultancy firm.

The submission should be clearly labelled/written "*Request for Proposal – Ground Water Mapping in the Eastern Province and Amayaga Region of the Southern Province of Rwanda - Technical Proposal*".

(a) Financial proposal

The Financial bid should comprise an indication of the full cost of delivering the task. The Financial Bid should include breakdown of professional fees/remuneration, reimbursables and miscellaneous expense etc (see Annex-1 for the suggested template). The submission should be clearly labelled/written "*Request for Proposal – Ground Water Mapping in the Eastern Province and Amayaga Region of the Southern Province of Rwanda - Financial Proposal*". The currency of the bid shall be in USD or RWF.

(b) Assessment processes of submitted proposals:

After the opening, each proposal will be assessed first on its technical merits and subsequently on its price. Responses deemed not to meet all of the requirements listed above will be considered non-compliant and rejected at this stage without further consideration. Failure to comply with any of the terms and conditions contained in this ToR, including provision of all required information, may result in a response or proposal being disqualified from further consideration. Final decision on the evaluation/proposal assessment will rest with UNICEF.

(c) Evaluation of technical proposals -Annex 2

The technical proposals will be evaluated as per the below evaluation criteria:

Technical Proposal		
No.	Criteria	Max. Points
1.0	Overall response	5
	(i) Overall clarity and completeness of the proposal.	2
	(ii) Overall concord between the RFP requirements and the proposal	3
2.0	Proposed Approach, Methodology and Workplan	30
	(i) Adequacy of the proposed implementation approach/ methodology	15
	(ii) Structure of the team to be deployed for the assignment	5

	(iii) Workplan	5
	(iv) Monitoring and coordination mechanism	5
3.0	Organizational Capacity	35
	(i) Organizational expertise and experience in works of similar nature and complexity completed over a minimum of five (5) years	5
	(ii) Qualifications and competence of the key staff	30
Total		70

Only proposals which receive a minimum of 49 points under the technical evaluation will be considered technically compliant and be eligible for the second phase (financial review).

(d) Evaluation of financial proposals

The total amount of points allocated for the price component is thirty [30]. The maximum number of points will be allotted to the lowest price proposal that is opened and compared among those invited firms/institutions which obtain the threshold points in the evaluation of the technical component. All other price proposals will receive points in inverse proportion to the lowest price e.g.:

$$\text{Max. Score for price proposal} \times \text{Price of lowest priced proposal}$$

$$\text{Score for price proposal X} = \frac{\text{Max. Score for price proposal} \times \text{Price of lowest priced proposal}}{\text{Price of proposal X}}$$

(e) Final computing of proposal score

Total proposal scores will be consolidated as follows:

Evaluation of proposal	Maximum points
Technical evaluation of proposals	70
Cost / Financial proposal	30
Total	100

The proposal with the best overall scoring, composed of technical responsiveness, merit and price, will be recommended for approval. UNICEF will notify the selected firm/institution by email when the evaluation and award process is completed.

12. Supervision

The consultancy firm will work under the joint supervision of the UNICEF Rwanda WASH Section and the Rwanda Water Resources Board.

13. Confidentiality

Unless otherwise specified, the consultant shall keep confidential all information and documentation being shared by Rwanda Water Resources Board, MININFRA, UNICEF and other WASH partners.

14. Contract management and administrative matters

UNICEF will issue the contract and pay the consultants, based on the terms agreed in the contract and after the approval of the deliverables by Rwanda Water Board.

The consultant will be responsible for all logistical arrangements associated with this contract. UNICEF /Rwanda Water Resources Board will provide a letter of support to facilitate obtaining visa and for the purpose of field visits where needed (for quality assurance). Other expenses such as international and local travels, visas, banking/cash services, or office space and equipment (including computers and photocopiers) shall be under the responsibility of the consultant.

15. Policy issues

- (i) No contract may commence unless the contract is signed by both UNICEF and the consultant;
- (ii) Consultants will not have supervisory responsibilities or authority on UNICEF budget; and

- (iii) UNICEF will conduct reference checks (persons/institutions) for feedback on services provided by the bidder.

16. How to Apply

Please send your offer by 18th October 2021 to rwasupply@unicef.org

Any request for clarification related to this tender should be directed to mumalik@unicef.org

copying dmupenzi@unicef.org by 13th October 2022

Annex-3 – Suggested template for financial proposal

<i>Deliverable</i>	<i>Number of person days</i>	<i>Delivery date</i>	<i>Costs</i>
Total:			