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BY THE EUROPEAN UNION

**Technical Assistance to Support the
Government of Lebanon's Preparation of
Exploiting and Producing Offshore Oil and
Gas Resources**



A PROJECT IMPLEMENTED BY A
GFA CONSULTING GROUP LED CONSORTIUM

13. APPENDICES

APPENDIX A: OFFICIAL CORRESPONDENCES RELATED TO THE SEA STUDY UPDATE



**SEA Update for E&P Activities Offshore Lebanon
SEA Report - Volume 1**



وزارة الطاقة والمياه
 هيئة إدارة قطاع الكهرباء
 رقم الملف: ١٢٩/٢٠١٢
 تاريخ: ١٢-١-٢٠١٢

للمتابعة والإفادة
 من خطة الإعلان

الرئيس
 و
 مدير إدارة
 [Signature]



١٣-١-٢٠١٢

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الجمهورية اللبنانية وزارة البيئة



الوزير

بيروت، في ١٢ تشرين الأول ٢٠١٢

رقم التسجيل: ٢٠١٢/٤٠٣

معالي وزير الطاقة والمياه
المهندس سيزار أبي خليل المحترم

الموضوع: تحديث دراسة التقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية
المرجع: كتاب وزارة الطاقة والمياه رقم ٣٢٩٩/و تاريخ ٢٠١٧/١٠/٤

تحية وبعد،

بالإشارة إلى الموضوع والمرجع المبينين أعلاه،

تري وزارة البيئة أنه يمكن أن يقتصر تحديث دراسة التقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية على الفقرات التي طرأت عليها مستجدات منذ العام ٢٠١٢ كما جاء في كتابكم أعلاه، على أن:

- ١- تكون الدراسة المحدثة متكاملة، أي ألا تكون عبارة عن الدراسة الأصلية في جزء والتعديلات في جزء آخر
- ٢- تحترم الدراسة الهيكلية المبينة في الملحق رقم ٣ من المرسوم ٢٠١٢/٨٢١٣
- ٣- يعتبر الجدول الملحق بكتابكم أعلاه بمثابة تقرير تحديد نطاق للتحديث المذكور.

هذا ونغتنم الفرصة للتذكير بما جاء في كتاب وزارة البيئة رقم ٣٦٢٩/ب تاريخ ٢٠١٦/٧/١٥ حول التوصيات البيئية المكتملة للمرسومين المتعلقين بتقسيم المياه البحرية الخاضعة للولاية القضائية للدولة اللبنانية إلى مناطق على شكل رقع، ودفتر الشروط الخاص بدورات التراخيص في المياه البحرية ونموذج اتفاقية الاستكشاف والانتاج، والكتاب رقم ٢٩٣/ب تاريخ ٢٠١٧/١/٢٠ حول بعض المواضيع المشتركة بين وزارتي الطاقة والمياه والبيئة، لا سيما ما له علاقة بـ:

- أ- اعداد دراسة تقييم بيئي استراتيجي لقطاع الموارد البترولية في الأراضي اللبنانية، ودمج التوصيات في مشروع القانون ذات الصلة
- ب- تضمين مشروع قانون الصندوق السيادي نسبة مئوية لقطاع البيئة والتنمية المستدامة.

أخيراً وليس آخراً، وبما أنه قد أصبح لوزارة الطاقة والمياه عدد من الاستراتيجيات المتعلقة بقطاع الطاقة (الكهرباء، الطاقة المتجددة، النفط والغاز، الخ)، توصي وزارة البيئة اعداد دراسة تقييم بيئي استراتيجي موحدة لهذه الاستراتيجيات، تكون بمثابة مظلة بيئية لقطاع الطاقة في لبنان.

وتفضلوا بقبول فائق الاحترام.



نسخة تبلغ إلى:

- وزارة البيئة - المديرية العامة للبيئة - مصلحة التخطيط والبرمجة
- وزارة البيئة - المديرية العامة للبيئة - مصلحة تكنولوجيا البيئة

EDL - LCC

مصلحة النفط - المديرية العامة للبيئة

١- للإطلاع وبيان الرأي كل باحث خاصه

٢- هيئة ادارة النفط: اعداد مشروع جوابي بالأمور المتعلقة بكم

وزارة البيئة، مركز للعازارية، الطابق الثامن، بلوك A-4

ص.ب.: ١١/٢٧٢٧، بيروت، لبنان - هاتف: ٩٧٦٥٥٥-١ (٩٦١) + أو هاتف الرقم الرباعي: ١٧٨٩ - فاكس: ٩٧٦٥٥٥-١ (٩٦١) +

صفحة الإنترنت: www.moe.gov.lb

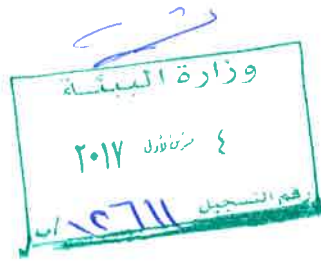
وزارة الطاقة والمياه
 هيئة إدارة قطاع البترول
 رقم الترخيص: ١٢٥٠/٩
 تاريخ: ١٠/٤/٢٠١٧

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 د. صلاح عبد السلام

 ٤ - ١٠ - ٢٠١٧



الجمهورية اللبنانية

وزارة الطاقة و المياه

الوزير

الرقم الصادر: ٩/٢٤٩٩

التاريخ: ١٧/٢/٢٠١٧

جانب وزير البيئة الأستاذ طارق الخطيب المحترم

الموضوع: أخذ رأي وزارة البيئة بتحديث دراسة تقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية.

المرجع: - المرسوم رقم ٢٠١٣/١٠٢٨٩ المتعلق بالأنظمة والقواعد المتعلقة بالأنشطة البترولية.

- المرسوم رقم ٢٠١٢/٨٢١٣ المتعلق بدراسة تقييم البيئي الاستراتيجي.

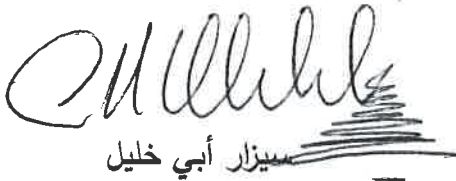
- دراسة التقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية.

بالإشارة الى الموضوع والمرجع المبينين أعلاه،

نتقدم من معاليكم بطلب النظر في الحاجة الى تحديث تقرير التقييم البيئي الاستراتيجي للأنشطة البترولية في المياه البحرية اللبنانية، آخذين بعين الاعتبار إقتراح هيئة إدارة قطاع البترول أن يقتصر التحديث على الفقرات والنصوص حيث تدعو الحاجة، وكما هو مبين في الملحق المرفق ربطاً.

مع الإشارة إلى أنّ التحديث المقترح لا يحتاج الى أي تعديل في نطاق الدراسة (scoping) وإنّته سيراعي المتطلبات المنصوص عنها في كل من المرسوم ٢٠١٣/١٠٢٨٩ والرسوم ٢٠١٢/٨٢١٣.

وزير الطاقة والمياه


سيزار أبي خليل



المرفقات:

- المستندات القانونية والتقنية والبيئية ومدى تأثيرها على دراسة التقييم البيئي الاستراتيجي.
- كتاب هيئة إدارة قطاع البترول رقم ١٣٩٠/هـ تاريخ ٢٠/٩/٢٠١٧.



الجمهورية اللبنانية
وزارة الطاقة و المياه
الوزير

الرقم الصادر: ٩٩٩/٢/٩

التاريخ: ٩/٢/٩٩

جانب وزير البيئة الأستاذ طارق الخطيب المحترم

الموضوع: أخذ رأي وزارة البيئة بتحديث دراسة تقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية.

المرجع: - المرسوم رقم ٢٨٩/١٠٣/٢٠١٣ المتعلق بالأنظمة والقواعد المتعلقة بالأنشطة البترولية.

- المرسوم رقم ١٣/٨٢١٣/٢٠١٢ المتعلق بدراسة تقييم البيئي الاستراتيجي.

- دراسة التقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية.

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وزير الطاقة والمياه


سيزار أبي خليل



المرفقات:

- المستندات القانونية والتقنية والبيئية ومدى تأثيرها على دراسة التقييم البيئي الاستراتيجي.
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الرقم الصادر: ١٣٩٠/هـ

التاريخ: ٢٠١٧/٩/٢٠

معالي وزير الطاقة والمياه سيزار أبي خليل المحترم

الموضوع: أخذ رأي وزارة البيئة بتحديث دراسة تقييم البيئي الاستراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية.

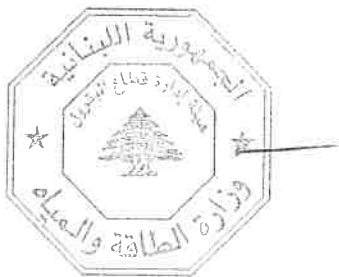
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بالإشارة الى الموضوع والمرجع المبينين أعلاه،

ولمّا كانت وزارة الطاقة والمياه قد قامت بإجراء دراسة تقييم بيئي استراتيجي لقطاع النفط والغاز في المياه البحرية اللبنانية عن طريق استشاري دولي، حيث تمّ إعداد الدراسة وفقاً لمتطلبات القانون ٢٠١٠/١٣٢ (قانون الموارد البترولية البحرية) وذلك بعد أن أطلقت "منشآت النفط في لبنان" الدراسة في عام ٢٠١١ وذلك قبل تعيين أعضاء مجلس إدارة هيئة إدارة قطاع البترول، وقد تمّ الانتهاء من الدراسة في عام ٢٠١٢،

ولمّا كانت هيئة إدارة قطاع البترول قد قامت وبالتنسيق والتعاون مع الجهات الحكومية وغير الحكومية ذات الشأن بتنفيذ عدداً من الاقتراحات والدراسات التي أوصت بها دراسة تقييم البيئي الاستراتيجي ومنها:

- إعداد الخطة الوطنية لمكافحة التسرب النفطي في المياه البحرية حيث يُعمل حالياً على إقرارها بمرسوم في مجلس الوزراء.



- إنشاء وتحديث قاعدة معلومات بيئية خاصة بالمنطقة الساحلية والمياه البحرية حيث أنهي العمل في المرحلة الأولى من المشروع.
- استكمال التشريعات المتعلقة بالبيئة والصحة والسلامة الخاصة بقطاع النفط والغاز.
- القيام بدورات تدريبية للإدارات الحكومية والجهات غير الحكومية حول مواضيع إدارة الصحة والسلامة والبيئة في قطاع النفط والغاز

ولمّا كان قد تمّ إصدار مجموعة من التشريعات الوطنية والخطط والاستراتيجيات البيئية الجديدة منذ إعداد دراسة التقييم البيئي الاستراتيجي، أهمها:

- المرسوم رقم ٨٢١٣ صادر في ٢٤/٥/٢٠١٢ (التقييم البيئي الإستراتيجي لمشاريع السياسات والخطط والبرامج في القطاع العام: وقد حدد الأصول الإلزامية الواجب إتباعها من أجل تقييم الآثار البيئية المحتملة لأي اقتراح مشروع سياسة أو خطة أو برنامج أو دراسة أو استثمار أو تنظيم يُطال منطقة لبنانية كاملة أو قطاع أو نشاط برمته بهدف التأكد من ملائمة هذه المشاريع لشروط الصحة والسلامة العامة وحماية البيئة واستدامة الموارد الطبيعية.
- المرسوم رقم ١٠٢٨٩ صادر في ٣٠/٤/٢٠١٣ (الأنظمة والقواعد المتعلقة بالأنشطة البترولية) وخصوصا المواد ١١ و ١٢ المتعلقة بدراسة التقييم البيئي الاستراتيجي.

ولمّا نصت المادة رقم ١٠ من المرسوم ٢٠١٢/٨٢١٣ (مدة الصلاحية) على ما يلي: "في حال لم يُبأشر بتنفيذ المشروع أو بوشر ولم يستكمل خلال مدة أقصاها خمس سنوات من تاريخ إقراره ونفاذه، وفي حال طرأت أية مستجدات أو متغيرات إن على صعيد الوضع البيئي أو على صعيد التشريعات ذات الصلة، يتوجب على صاحب المشروع أن يُعيد التقييم البيئي الاستراتيجي وفقاً لأحكام هذا المرسوم إلا في حال كان مشروع السياسة أو الإستراتيجية".

ولمّا كانت وزارة الطاقة والمياه وهيئة إدارة قطاع البترول قد أطلقت دورة التراخيص الأولى في شهر أيار ٢٠١٣ بعد إنتهاء دراسة التقييم البيئي الاستراتيجي، رغم أنّ أنشطة الاستكشاف والانتاج لم تبدأ



بعد بانتظار موعد إنتهاء استقبال العروض في ١٢ تشرين الاول ٢٠١٧ ليتم بعدها اعطاء حقوق بترولية الى شركات نفط عالمية ليصار الى مباشرة الاعمال الميدانية،

ولمّا كان يهم هيئة إدارة قطاع البترول التقيّد بالقوانين المرعية الإجراء لاسيما ما يضمن حسن الإدارة البيئية للأنشطة البترولية، والتنمية المستدامة لقطاع النفط والغاز،

لذلك،

تضع الهيئة بين أيديكم ملخصاً، مرفق ربطاً، يوضح (١) المستجدات القانونية من تشريعات وطنية وخطط واستراتيجيات بيئية جديدة، (٢) المستجدات على الوضع البيئي، (٣) المهام المنفذة والتي هي قيد التنفيذ من قبل هيئة إدارة قطاع البترول ووزارة الطاقة والمياه وخصوصاً بما يخص الصحة والسلامة والبيئة، و (٤) النقاط والعناوين الممكن تحديثها في تقرير تقييم البيئي الاستراتيجي وفق المتطلبات المحددة في الملحق رقم ٢ من المرسوم ٢٠١٢/٨٢١٣، وذلك لتبيان الفوائد والنتائج المتوقعة من تحديث تقرير التقييم البيئي الاستراتيجي، حيث تبين أنّ:

- تأثير المعطيات والمعلومات المستجدة على منحى واتجاه ونتائج دراسة التقييم الاثر البيئي الاستراتيجي هو محدود جدا حيث أن لا جديد يذكر في الوضع البيئي البحري، او في تحديد تقنيات الاستكشاف والانتاج او الأنشطة البترولية المنفذة من/على البر.
- إعادة هيكلة تقرير تقييم البيئي الاستراتيجي وفق المرسوم رقم ٢٠١٢/٨٢١٣ والمرسوم ٢٠١٣/١٠٢٨٩ هو امر ممكن ومفضل الا ان قيمته الإضافية سوف تقتصر على الشكل فقط.
- إنّ الاستراتيجيات الخاصة بالإدارة البيئية ومشاريع المراسيم والتوجيهات المرتبطة والتي هي قيد التحضير من قبل هيئة إدارة قطاع البترول بالتعاون مع الجهات ذات الشأن، قد يكون لها تأثير كبير على الإدارة البيئية لقطاع النفط والغاز والتي تسعى دراسة تقييم البيئي الاستراتيجي لتحديدها.



على ضوء ما تقدم،

نتقدم من معاليكم بالطلب من معالي وزير البيئة النظر في الحاجة الى تحديث تقرير التقييم البيئي الاستراتيجي للأنشطة البترولية في المياه البحرية اللبنانية، آخذين بعين الاعتبار إقتراح هيئة إدارة قطاع البترول أن يقتصر التحديث على الفقرات والنصوص حيث يوجد تجديد، على أن يتم تركيز العمل على وضع خطة الادارة البيئية لتجنب أو تخفيف أو معالجة الآثار السلبية المرتقبة عند وضع المشروع حيز التنفيذ (Mitigation plan) كما وتحديد نطاق واحتياجات وآلية وتواتر وأمكنة عمليات المراقبة والرصد لمتابعة نتائج المشروع عند التنفيذ (Monitoring plan) وخطة التعويض على المتضررين (compensation plan)، كما وتحديد مسؤوليات الإدارات الرسمية المعنية وأساليب التنسيق الضرورية لتطبيق خطة الإدارة البيئية المقترحة،

مع الإشارة إلى أنّ التحديث المقترح لا يحتاج الى أي تعديل في نطاق الدراسة (scoping) في حين أنّ أي تعديل لنطاق الدراسة أو إعادة الدراسة أو تحديثها بأكملها يجب أن يراعي المتطلبات المنصوص عنها في كل من المرسوم ٢٠١٣/١٠٢٨٩ والمرسوم ٢٠١٢/٨٢١٣.

وتفضلوا بقبول فائق الاحترام

هيئة إدارة قطاع البترول

رئيس مجلس الإدارة

وسام شباط



المرفقات:

■ المستندات القانونية والتقنية والبيئية ومدى تأثيرها على دراسة التقييم البيئي الاستراتيجي.

ملحق ١

المستجدات القانونية والبيئية والتقنية ومدى تأثيرها على المعلومات المطلوبة في دراسة التقييم البيئي الإستراتيجي الخاصة المتعلقة بالأنشطة البترولية في المياه البحرية اللبنانية

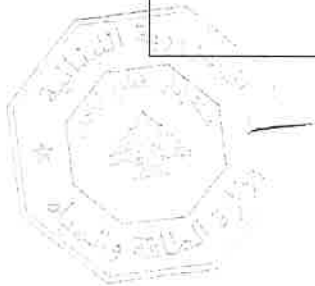
المعلومات المطلوبة وفق الملحق رقم ٢	المستجدات	مدى تأثيرها على الدراسة
ما هي الأهداف الأساسية للسياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار المقترح؟	لا مستجدات	لا تغيير متوقع
ما هي العناصر الأساسية للسياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار المقترح؟	<p>- دراسة داخلية (internal document) أعدت من قبل الهيئة حول سيناريوهات محتملة تحاكي تطور قطاع النفط والغاز ولكن تعالج الناحية الاقتصادية - التجارية منها وليس التقنية و/أو البيئية.</p> <p>- دراسات جيولوجية داخلية تشير إلى وجود غاز طبيعي مع امكانية وجود نفط في المياه البحرية</p>	<p>لا تغيير جذري متوقع</p> <p>حيث ان السيناريوهات الجديدة لا تختلف كثيرا عن السيناريوهات المعتمدة بتقرير دراسة تقييم الاثر البيئي الاستراتيجي ولا تتطرق الى تفاصيل السيناريوهات من ناحية البدائل، والتكنولوجيات وغيرها</p>
ما هي النشاطات التي قد تنتج عن السياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار المقترح؟	لا مستجدات	<p>لا تغيير متوقع</p> <p>فالأنشطة البترولية واضحة وتتضمن الاستطلاع، الاستكشاف، الانتاج والتوقف عن العمل. يمكن النظر في تكنولوجيات الاستكشاف والانتاج الا انه وفي ظل غياب تحديد لهذه</p>

<p>التكنولوجيات من قبل الهيئة، تبقى السيناريوهات الطريقة الفضلى لمعالجتها</p>		
<p>لا تغيير متوقع حيث ان تقسيم البلوكات ما زال على حاله والرؤية نحو تنفيذ الانشطة البترولية لم تتغير. الا انه يمكن النظر في اجراء مشاركة أوسع مع العامة لاسيما القطاعات والشرائح الاجتماعية. لكن تجدر الاشارة الى انه من الصعب تحديد الشرائح الاجتماعية والقطاعات والمنطقة الجغرافية حيث ان قطاعات مختلفة كما ومواقع مختلفة تتأثر بطرق مختلفة وبأوقات ومراحل مختلفة كلها رهن سيناريوهات تطور القطاع.</p>	<ul style="list-style-type: none"> - مرسوم رقم ٢٠١٧/٤٢ حول تقسيم المياه البحرية الخاضعة للولاية القضائية للدولة اللبنانية الى بلوكات - مسودة دراسة حول تحديد المواقع الممكنة لتقديم الخدمات اللوجستية (supply base) - استراتيجية عرض البلوكات البحرية للمزايدة (دراسة داخلية) - مسودة دراسة حول تأثير القطاع على الوضع الاقتصادي من ناحية التوظيف وتقديم الخدمات (ripple effects) 	<p>ما هي القطاعات أو المنطقة الجغرافية أو الشرائح الاجتماعية التي يمكن أن تتأثر بنتائج السياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار المقترح؟</p>
<p>يمكن تحديث تقرير تقييم الاثر البيئي الاستراتيجي وقاعدة المعلومات القانونية ضمن المجلد رقم ٦.</p>	<p>أهم المستجدات في النصوص القانونية:</p> <ul style="list-style-type: none"> - المرسوم رقم ٢٠١٢/٨٢١٣ حول دراسة تقييم الاثر البيئي الاستراتيجي - المرسوم رقم ٢٠١٢/٨٦٣٣ حول اصول تقييم الاثر البيئي - المرسوم رقم ٢٠١٣/١٠٢٨٩ حول الأنظمة والقواعد المتعلقة بالأنشطة البترولي 	<p>ما هي التدابير القانونية، والإدارية، والتقنية، والمالية (بما فيها الضريبية) الموجودة أو التي سيتم اتخاذها لتنفيذ مشروع السياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار بصورة صحيحة، ومن ثم رصد النتائج وتقييم الإنجازات؟</p>

	<ul style="list-style-type: none"> - مرسوم رقم ٢٠١٧/٤٢ حول تقسيم المياه البحرية الخاضعة للولاية القضائية للدولة اللبنانية الى بلوكات - مرسوم رقم ٢٠١٧/٤٣ حول اتفاقية الاستكشاف والانتاج - مراسيم متعلقة بالانضمام الى اتفاقيات او بروتوكولات وقرار تعديل اتفاقيات (بازل، برشلونة، التغير المناخي، - مسودات قوانين ومراسيم بيئية واخرى متعلقة بإدارة قطاع النفط والغاز - تفعيل نظام التدقيق البيئي 	
<p>يمكن تحديث التقرير لتضمين المستجدات حول المعطيات الأولية البيئية القليلة المتوفرة والتي قد تؤثر في تحديد وتقييم الآثار وكيفية معالجتها.</p>	<p>اهم المستجدات:</p> <ul style="list-style-type: none"> - المسح الذي أجرته وزارة البيئة بالتعاون مع Oceana والمجلس الوطني للبحوث العلمية لخمس مواقع بحرية - الاستراتيجية الوطنية للتنوع البيولوجي وخطة العمل - الخطة الوطنية الثانية لكفاءة الطاقة، وزارة الطاقة والمياه، ٢٠١٦ 	<p>ما هي المعطيات الأولية البيئية المتعلقة بالمشروع بما في ذلك تأثيرها (المباشر أو غير المباشر) على:</p> <ul style="list-style-type: none"> - المحيط الطبيعي والاجتماعي للكائنات الحية وإستدامة الأنظمة والموائل الأيكولوجية. - استهلاك الموارد الطبيعية كالمياه والهواء والطاقة والمواد المستخرجة والمساحات المعدة للبناء أو للإستثمار والتربة الخ - إنتاج الملوثات كالنفايات الصلبة والمياه المبتذلة

	<ul style="list-style-type: none"> - مساهمة لبنان المحددة وطنيًا (INDC) التي قدّمت الى الأمانة العامة لاتفاقية الأمم المتحدة الاطارية بشأن تغير المناخ، ٢٠١٥ - الخطة الوطنية لمكافحة التسرب النفطي في المياه اللبنانية - دراسات بيئية استراتيجية في دول مجاورة (مثل قبرص، فلسطين المحتلة) 	<ul style="list-style-type: none"> - والإنبعاثات الهوائية - نسبة الضجيج وإمكانية الأذية الصوتية - التنوع البيولوجي والإرث الطبيعي - تغير المناخ واستنفاد طبقة الأوزون - الصحة والسلامة العامة - المعطيات الاجتماعية والإقتصادية التي من شأنها أن تؤثر سلبا على البيئة وعلى استخدام الموارد الطبيعية و/أو على حسن تنفيذ السياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار.
<ul style="list-style-type: none"> - إلا ان هذه السيناريوهات الجديدة لا تنطبق الى التفاصيل من ناحية البدائل، والتكنولوجيات وغيرها 	<ul style="list-style-type: none"> - دراسة داخلية (internal document) أعدت من قبل الهيئة حول سيناريوهات تحاكي تطور قطاع النفط والغاز ولكن تعالج الناحية الاقتصادية - التجارية منها وليس التقنية و/أو البيئية. 	<p>ما هي البدائل المتاحة للسياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار المقترح لتحقيق نفس الأهداف والنتائج المتوخاة؟</p>
<ul style="list-style-type: none"> - إن دراسة تقييم البيئي الاستراتيجي قد تطرقت الى الآثار البيئية والاقتصادية - الاجتماعية ولكن بطريقة وصفية (qualitative). إلا أن تحديث الدراسة في ضوء المستجدات سوف يعتمد ايضا على التحليل الوصفي في ظل غياب تحديد 	<p>اهم المستجدات:</p> <ul style="list-style-type: none"> - دراسة سيناريوهات التسربات النفطية وآثارها المحتملة ضمن الخطة الوطنية لمكافحة التسرب النفطي في المياه اللبنانية - مسودة دراسة حول تحديد المواقع الممكنة لتقديم الخدمات اللوجستية (supply base) 	<p>ما هي الآثار البيئية والاجتماعية والإقتصادية المرتقبة، المباشرة منها أو غير المباشرة، بما فيها الآثار السلبية التي يمكن تصحيحها أو تلك التي لا يمكن تصحيحها (Residual impacts)، و/أو الآثار التراكمية (Cumulative impacts)، و/أو الآثار عبر الحدودية (Transboundary impacts)، و/أو</p>

<p>واضح لنطاق الأنشطة، ووتيرتها، التكنولوجيات المستخدمة ووضوح المحيط البيئي.</p>	<p>- مسودة دراسة حول تأثير القطاع على الوضع الاقتصادي من ناحية التوظيف وتقديم الخدمات (ripple effects)</p>	<p>النتائج الإيجابية التي يتوجب تعزيزها التي قد تنتج عن اعتماد هذه البدائل؟</p>
<p>إن الدراسات المذكورة قد تطرقت الى النواحي الاقتصادية - التجارية للأنشطة البترولية من حيث المردود العام والتوظيف الا انها لا تعالج كلفة البدائل او تقديرات الآثار الجانبية البيئية والاجتماعية والاقتصادية.</p>	<p>أهم المستجدات: - دراسة داخلية (internal document) أعدت من قبل الهيئة حول سيناريوهات تحاكي تطور قطاع النفط والغاز تعالج الناحية الاقتصادية - الاجتماعية - مسودة دراسة حول تأثير القطاع على الوضع الاقتصادي من ناحية التوظيف وتقديم الخدمات (ripple effects)</p>	<p>ما هي الأساليب والطرق التي ستعتمد لتقدير الآثار والتقدير المبدئي بشكل عام للتكاليف والأرباح بالنسبة للبدائل المطروحة مع الأخذ بعين الاعتبار المعطيات المتوفرة؟ (كاحتساب الكميات، وتقدير القيمة المادية أو التقدير المبدئي بشكل عام للجدوى الاقتصادية للبدائل المطروحة آخذة بعين الاعتبار تقدير مبدئي لكلفة التدهور البيئي، وتعداد الآثار المحتملة أو جدولتها بحسب الأهمية أو الأولوية).</p>
		<p>ما هي التقديرات المبدئية بشكل عام للتكاليف والأرباح المباشرة أو غير المباشرة التي قد تتحقق على المستوى البيئي، الاجتماعي، والإقتصادي نتيجة لتطبيق السياسة أو الخطة أو البرنامج أو الدراسة أو الإستثمار؟</p>
		<p>ما هي أهمية التقديرات المبدئية بشكل عام لهذه التكاليف والأرباح بالنسبة للنتائج المتوخاة و/ أو الأولويات الوطنية؟</p>



<p>لم تُلاحظ خطة الادارة البيئية في دراسة التقييم البيئي الاستراتيجي، عليه وفي ظل العمل على استكمال النصوص القانونية واستراتيجيات إدارة شؤون البيئة والصحة والسلامة في القطاع، يمكن لخطة الإدارة البيئية المزمع وضعها أن تتضمن الاعمال الجارية.</p>	<p>اهم المستجدات، العمل على:</p> <ul style="list-style-type: none"> - تحديث النصوص التي ترقى إدارة قطاع النفط من ناحية البيئية والصحة والسلامة - وضع قواعد إرشادية حول الانبعاثات ومياه الصرف الصناعي (النفايات السائلة والمواد الكيماوية) - وضع قواعد إرشادية حول المراقبة البيئية - تحديد بدائل استراتيجية لإدارة النفايات في قطاع النفط والغاز - وضع قواعد إرشادية حول إدارة النفايات الخطرة - وضع قواعد إرشادية حول إدارة المواد الكيماوية - وضع قواعد إرشادية حول العمليات البحرية - وضع الخطة الوطنية لمكافحة التسرب النفطي في المياه اللبنانية 	<p>ما هي التدابير الوقائية أو التخفيفية التي ستتخذ للحد أو للتخفيف من الآثار المتبقية (Residual impacts).</p>
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THIS PROJECT IS FUNDED
BY THE EUROPEAN UNION

**Technical Assistance to Support the
Government of Lebanon's Preparation of
Exploiting and Producing Offshore Oil and
Gas Resources**



A PROJECT IMPLEMENTED BY A
GFA CONSULTING GROUP LED CONSORTIUM

APPENDIX B: TERMS OF REFERENCE FOR THE SEA STUDY UPDATE



**SEA Update for E&P Activities Offshore Lebanon
SEA Report - Volume 1**



1. Project information

For the potential exploration and production of offshore oil and gas resources, the preparation, approval and enforcement of a comprehensive legislative and organizational framework is of the utmost importance to ensure that maritime resources are protected and natural resources are utilized applying the highest international standards of transparency, accountability and environmental protection.

For this to be achieved, the European Union (EU) is financing a 30-month technical assistance to the Lebanese Petroleum Administration (LPA) and the Ministry of Energy and Water (MoEW) as well as to the Ministry of Environment (MoE) as an indirect beneficiary. The project's implementation is structured under three main components:

- Component 1: Organizational & Functional Capabilities (including technical issues),
- Component 2: Strategic, Policy and Economic Capabilities
- Component 3: Governance and Transparency/Accountability Enhancement

Through a pragmatic approach, the project strategically reviews the processes and procedures within the LPA (taking into account the complementary responsibilities of the relevant Ministries), and the options for LPA's role, such as the various auditing, regulation, approval and stewardship responsibilities.

The LPA has a responsibility to develop relevant policies and strategies and is involved in fundamental decisions regarding how Lebanon's oil and gas resources are developed and used. The project therefore supports the development of relevant policies, strategies, analytical studies and tools such as frameworks for licensing, development of the upstream industry, development of specific guidelines and strategy across a variety of areas including for example the LPA organizational structure and local content options.

Transparency in the control of the offshore activities is an important issue on the national agenda of Lebanon, as well as neighboring countries and is subject to high interest in the wider public and a number of active national NGOs. Transparent state control and regulation mechanisms are crucial in attracting the long term commitment of international oil and gas companies. The project will ensure development of LPA's responsibilities and capacities on economic exploitation, environmental safety and financial regulation and revenue management.

2. Context of the assignment

2.1. General Context

The LPA is an independent public administration that operates under the tutelage of the Minister of Energy and Water.

The LPA was established by Decree no. 7968, issued on April 7, 2012. The decree outlines, inter alia, the organization of, duties and mandates of the LPA, with a board of 6 directors which shall function for 6 years, renewable once.

The LPA consists of 6 administrative units, headed by one director who is also a board member:

- The Unit of Strategic Planning
- The Unit of Technical and Engineering Affairs
- The Unit of Geology and Geophysics (G&G)
- The Unit of Legal Affairs
- The Unit of Economic and Financial Affairs
- The Unit of Quality, Health, Safety and Environment (QHSE)

Each board member/director undertakes the Board's chairmanship on a yearly rotation. Currently, the staff at LPA counts 21 individuals; these are educated professionals with experience in the oil and gas sector and other related fields, as well as, support staff hired on 11-month contracts, which are renewed routinely. One of the main tasks of the LPA is to advise the Minister (MoEW), who sits on the Council of Ministers (COM).

In 2013 Lebanon completed a first pre-qualification round to enable prequalified companies meeting the technical, financial, legal and Quality, Health, Safety and Environmental (QHSE) criteria to participate in the 1st offshore licensing round. However, the bid round was postponed until January 2017 until two pending decrees were approved by the Council of Ministers. The long-awaited development resulted in the announcement of 5 blocks open for bidding and in the organization of a second prequalification round. A total of 51 oil and gas companies (13 as operators and 38 as non-operators) were eligible to participate in the bid round. Blocks 4 and 9 received one offer each from a consortium of 3 companies: Total, Eni and Novatek. Lebanon evaluated the offers and underwent technical negotiations with the Consortium so to enable the CoM to take final decision about the awards. The CoM approved the award of the contracts on December 14, 2017.

2.2. Specific Context

Within the framework of the first licensing round in 2013, and to ensure that negative impacts are controlled and minimized and that benefits are maximized, the Government of Lebanon had carried out a Strategic Environmental Assessment (SEA) through an international consultant for the Offshore Petroleum Sector in Lebanon in compliance with the requirements of Law 132/2010 (Offshore Petroleum Resources Law). The SEA was commissioned in 2011 by the Lebanese Oil Installations (the LPA

was not yet created at that time), finalized in 2012 and published by the LPA in 2014.

The SEA has highlighted several data gaps as well as identified a number of recommendations to form an action plan for the next phases of work. The Lebanese Petroleum Administration (LPA) has initiated several projects in line with the suggested recommendations including cooperation programs with the Norwegian Oil for Development (OfD) Program and the United Nations Development Program (UNDP) addressing topics related, but not limited, to:

- Coordination and streamlining of processes between concerned parties,
- Development of sector specific Health, Safety and Environmental (HSE) legislation, guidelines and standards (under SODEL project),
- HSE baseline data management,
- Emergency preparedness, response and contingency planning,
- Technical support, training and capacity building,
- Awareness raising and public outreach.

Since the preparation of the SEA in 2011/2012, new Lebanese environmental legislations were issued including the SEA decree (Decree No. 8213/2012) which sets the statutory procedures to be followed for the assessment of potential environmental impacts of any policy, plan, program, study, investment or organization proposal that tackles an entire Lebanese region or an activity sector; as well as the Petroleum Activities Regulations (Decree No. 10289/2013) which further develops the provisions governed by the OPRL 132/2010 including specific provisions for undertaking the SEA.

Since Article 10 of Decree no. 8213/2012 has stipulated that: “In the event the implementation of the proposal was not initiated, or in the event it was initiated and not completed within a period of five years as of the date of its ratification and entry into force, and in the event any new developments or variables occur at the environmental or legislative level, the project owner should then carry out another strategic environmental assessment in accordance with the provisions of this Decree, with the exception of policy and strategy proposals”.

Based on the above, and in light of the current licensing round, the LPA wishes to update the SEA report in line with international best practices. Towards this end, LPA has undertaken a quick assessment of new information, progress and updates undertaken on environmental, economic, social, technical and legal levels to identify aspects of the SEA that will be impacted by this new information.

Upon consultation with MOE, the current update of the SEA aims to reflect the updates in new information that might impact the structure, thinking and results of the SEA while focusing on the development of an Environmental Management Plan including a Mitigation Plan and an Environmental Monitoring Plan as well as a Compensation Plan for offshore oil and gas activities.

Accordingly, this document constitutes the Terms of Reference for the provision of consultancy services for Updating the Strategic Environmental Assessment (SEA) for the Offshore Petroleum Sector.

3. Requested services

3.1. Activities

The experts shall implement the assignment by undertaking the following tasks, further detailed in the following sub-sections:

- *Task 1: Preparatory Activities and data update*
- *Task 2: Development of Environmental Management Plan: Mitigation Plan, Monitoring Plan and Compensation Plan*
- *Task 3: SEA Report Update*

3.1.1 Task 1: Preparatory Activities and Data Update

Preparatory activities include several activities such as:

- a) Kick-off meeting: to be held with representatives of the LPA and MoE to confirm the scope of the SEA update and discuss detailed work plan, data sources, methodology and time schedule.
- b) Stakeholders Engagement: including identification/update of relevant stakeholders based on SEA's Stakeholder Engagement Plan, meeting with identified stakeholders of influence and interest to consult on environmental management and compensation aspects.
- c) Data Update: Identification of data sources and availability and collection of new data and information to update relevant SEA sections.
 - Incorporate the latest sector updates and development plans.
 - Baseline Data Compilation: the experts and the LPA shall consult with the various ministries and stakeholders in order to collect updated data that were not available at the time of the preparation of the previous SEA in 2012, and identify existing and proposed studies, programmes, and projects that are likely to affect or be affected by the E&P activities.
 - Legal and Institutional Analysis: the legal and institutional analysis will include a review of new, updated and draft relevant legislation and their interaction with the E&P programme. The legal analysis should also include an analytical matrix of aspects that need to have legal provisions for the proper implementation of the SEA management Plan

3.1.2 Task 2: Development of Management Plan

The experts shall undertake the following tasks:

- a) Impact Assessment and Alternative analysis
 - Update, if need be based on new data, the preferred alternatives and the impacts of different scenarios in the SEA.
- b) Environmental and Social Management Strategy

The experts shall develop an environmental and social management strategy for O&G activities in the offshore Lebanon. This strategy should be translated into a mitigation plan and a monitoring plan as to provide

- **mitigation measures** to minimize or eliminate anticipated impacts;
- an **environmental and social monitoring plan** to manage those impacts, ensure residual levels are acceptable, and monitor potential improvement in some indicators. Monitoring is not limited to quantitative or technological measurements and should include as many qualitative aspects as possible.
- Proposes an **institutional framework for the implementation** of the environmental and social management strategy;
- Proposes **legal updates** needed for the sustainable implementation of the offshore E&P activities (this will be done in line with the SODEL's project related to HSE governance of the sector);
- Proposes **implementation mechanisms** for the sustainable implementation of the strategy; and
- **Compensation plan** and a grievance mechanism
- Proposes a capacity building plan.

3.1.3 Task 3 SEA Report Update

- a) Draft SEA Report

A update of the SEA report will be prepared to become the master guiding environmental document to the offshore E&P activities. The findings of all the tasks listed above will be incorporated into this draft report, the structure of the report shall include the requirements of Annex 3 of SEA decree (Decree No. 8213/2012) as appropriate.

The report will include:

- Updated presentation of environmental and socio-economic baseline data (where data exists)
- Updated data gap analysis (where data exists)
- Updated legislative and regulatory assessment (where data exists)

- Compiled list of Environmental / Sustainability key issues based on consultation with stakeholders, existing plans and developed scenarios, and regulatory and baseline data assessment;
- Updated section on constraints and opportunities of the E&P offshore activities;
- Updated environmental impact assessment (where data is available)
- Updated Scenarios development (where data is available)
- Identification of alternatives: alternatives to be assessed and compared need to be identified in close coordination with the LPA, MoE and primary stakeholders. Alternatives to be considered may be related to technologies to be used, timing of activities, location of activities/facilities, scope of activities, etc. The consultants shall propose a list of alternatives to be considered for validation by stakeholders;
- Environmental Mitigation plan
- Environmental monitoring plan
- Compensation Plan
- Updated reporting on stakeholders' management

b) Consultation on the draft SEA Update

The report will then be made available for stakeholders review and commenting prior to holding a general consultation workshop. The SEA review phase could also consider transboundary consultations according to prevalent legislation in Lebanon and as applicable.

At least one consultation workshop shall be conducted to discuss the findings of the SEA report with the identified stakeholders.

c) Final SEA Report

The final SEA report shall be prepared and submitted to the LPA/MoEW incorporating the inputs from primary stakeholders i.e. LPA and MOE and the consultation workshops.

3.2. Key deliverables

Deliverable	Time	Tentative Dates
KOM minutes and Inception Report	One (1) week from KOM	Kick-off mission second half of January 2018 (either week c/January 15 th or 22 nd)
Issues Identification Report	Six (6) weeks from KOM	Issues identification mission by mid-February 2018 and report by end of February
Initial SEA Report with Data Updates and Gap Analysis, to include all sections	Ten (10) weeks from KOM	First week of April 2018
Internal Review of SEA Report (LPA/MOE)	Twelve (12) weeks from KOM	Second half of April 2018
Draft SEA report issued for Public Consultation	Fourteen (14) weeks from KOM	First half of May 2018
Consultation on SEA report and Public Consultation	After approval of LPA/MoE on the draft SEA report	First half of June 2018
<u>Final SEA report</u>	Two (2) weeks from SEA report consultation and public consultation	End of June 2018

3.3. Duties and responsibilities

The Team of Experts shall perform their work in close co-operation with the Key Experts of the project, as well as the LPA's directors and their designated staff.

The work will be carried out both through missions and/or working-stays in Beirut.

The Team of Experts will be responsible for performing their duties to the highest professional standards and in line with international and industry best practice.

The International Senior Key Expert(s) shall be responsible to oversee the preparation of the SEA deliverables, guide and support in planning the activities, participation in the consultation workshops and peer review all deliverables prior to their issuance.

The National Senior Key Expert(s) shall lead the preparation of the SEA deliverables in close coordination with the international key expert.

The junior experts shall support in stakeholders' consultation, collection of data, and preparation of maps using GIS as well as drafting selected parts of the SEA report under the supervision of the senior experts.

4. Timetable

Time period: January 2018 to June 2018.

5. Expert profile

Senior Non-Key expert(s) (International)

Qualifications and Skills:

- Education: higher university degree or equivalent in environment related subjects
- Language requirements: fluency in English, Arabic is an asset
- Communication: proven communication skills (written, oral and listening)
- Computer Literacy: internet and Microsoft office use, knowledge of GIS and other analytical tools is an asset.

Professional Experience:

- At least 10 years of experience in environmental management.
- Proven experience in preparation and review of strategic environmental assessment reports for strategic documents on the national level.
- Experience in developing environmental policies and strategies for the energy sector is an asset.
- Experience in preparation and review of strategic environmental assessments for the development of the Offshore Oil and Gas sector(at least 3)
- Experience in advising Government, environmental regulators and policy makers;
- Previous working experience in Middle Eastern region (especially in Lebanon) is considered an asset.

Senior Non-Key Expert(s) (National)

Qualifications and Skills

- Education: university degree or equivalent in environmental engineering, natural environment or related subjects
- Language requirements: fluency in Arabic and English.
- Communication: proven communication skills (written, oral and listening)
- Computer Literacy: internet and Microsoft office use.

Professional Experience

- At least 10 years of experience in key disciplines (air quality, waste, wastewater, ecosystem, marine, etc.)
- Experience with SEAs and EIAs in the Oil and Gas sector.
- Proven knowledge of the legal and institutional framework in Lebanon.

Junior Expert(s):

Qualifications and Skills

- Education: university degree or equivalent in environmental sciences or related subjects
- Language requirements: fluency in Arabic and English.
- Communication: proven communication skills (written, oral and listening)
- Computer Literacy: internet and Microsoft office use.

Professional Experience

- At least 5 years of experience in environmental consulting, including experience in preparation of SEA/EIA reports.
- Proven experience with stakeholder consultation
- Proven knowledge of the legal and institutional framework in Lebanon;
- Experience in GIS and mapping is an asset.



THIS PROJECT IS FUNDED
BY THE EUROPEAN UNION

**Technical Assistance to Support the
Government of Lebanon's Preparation of
Exploiting and Producing Offshore Oil and
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A PROJECT IMPLEMENTED BY A
GFA CONSULTING GROUP LED CONSORTIUM

APPENDIX C: CVs OF KEY SEA STUDY UPDATE TEAM MEMBERS



**SEA Update for E&P Activities Offshore Lebanon
SEA Report - Volume 1**



PROPOSED POSITION: PROJECT MANAGER

Years of experience: 20

PERSONAL DATA:

Family Name: Khoury
First Name: Ricardo
Nationality: Lebanese-Brazilian
Date of birth: 20-02-1973
Place of birth: Brazil
Civil Status: Married

KEY QUALIFICATIONS & EXPERTISE:

- Project management
- Environmental policy development
- Institutional strengthening and capacity building
- Oil and gas
- Environmental Impact Assessment (EIA)
- Environmental Risk Assessment (ERA)
- Strategic Environmental Assessment (SEA)
- Environmental baseline studies
- Solid waste management
- Air quality management

EDUCATION

- **Masters in Engineering** (M.E.) Major Environmental and Water Resources Engineering - American University of Beirut (February 1999)
- **Bachelor in Engineering** (B.E.; with distinction) - Major Civil and Environmental Engineering - American University of Beirut (July 1996)

EXPERIENCE RECORD:

1. **ELARD (Full Time, March, 2000- to date)**
Title: Head of Environmental Division / Manager ELARD Emirates

Coordinating and participating in Environmental Impact Assessment (EIA), Environmental Risk Assessment and Strategic Environmental Assessment (SEA) studies (more than 100 studies successfully completed). Selected references:

- Strategic Environmental Impact Assessment for the Program of Exploration and Production of Hydrocarbons in the Offshore Montenegro, Ministry of Economy
- Environmental, Social and Health Impact Assessment for E&P Activities for Block II, Syria, SNG East
- Implementation of Environmental and Social Action Plan (ESAP) for onshore and offshore oil and gas fields in Egypt, EBRD
- Environmental, Health and Social Impact Assessment for the Iraq Crude Oil Export Pipeline (687 km) – Iraq Oil Projects Company/SNC Lavalin
- Environmental Impact Assessment for OFON II Offshore E&P activities in Nigeria – TOTAL E&P / Subsea7
- Environmental and Social Impact Assessment for the Missan Oil Export Pipeline (270 Km) - PetroChina
- Health, Safety and Environmental Impact Assessment for the Carbon Black and Delayed Coker Project in Ruwais, Abu Dhabi – TAKREER / Samsung Engineering
- Call-off for HSE Services and Risk Assessment for ORYX, Ras Laffan, Qatar – ORYX GTL
- Environmental and Social Impact Assessment for the New Nassiriya Refinery FEED Project (300,000 BSPD) – SCOP/Foster Wheeler UK
- Environmental Monitoring Services and Flare Radiation Monitoring at three Offshore Platforms in Azerbaijan (BP Azarbaijan)
- Environmental, Health and Social Impact Assessment for the Karbala Refinery FEED Project (140,000 BSPD) – Technip Italy
- Strategic Environmental Assessment (SEA)- Offshore drilling program – onshore processing facility – electricity generation from gas flaring - Tullow oil and gas Uganda
- Environmental, Social and Health Impact Assessment (ESHIA)- Exploratory Drilling (Four wells) – SHELL Syria
- Environmental Impact Assessment (EIA) – Arab Gas Pipeline – IPA Consultants
- Environmental and Social Impact Assessment (ESIA) – Onshore drilling, seismic, pipeline and gas processing facility – EBLA Gas Project - PetroCanada
- Environmental Impact Assessment (EIA) – seismic and onshore drilling and EBS Studies – Hayan Petroleum and INA
- Environmental Site Assessment- Tabyeh gas treatment plant – TOTAL Syria
- Environmental Impact Assessment (EIA)- onshore drilling - TATNEFT Syria
- Environmental Impact Assessment for a 2D/3D seismic acquisition project in Ash Shaer Development Area of Central Syria, Syria.
- Environmental Impact Assessment for an exploratory oil and gas wells in Palmyra, Syria.
- Environmental Impact Assessment for an exploratory deep oil well in Syria.
- Ambient Air Quality and Stack Emission Monitoring - Ruwais Industrial Complex, Borouge, UAE

- Environmental Impact Assessment for the Jieh and Zouk Powerships Projects (Karpowership Company Limited), Lebanon.
- Strategic Environmental Assessment (SEA) of Lebanon's Renewable Energy Sector Project
- National Environment Strategy for the Kingdom of Saudi Arabia, Booz Allen Hamilton, contracted by the KSA's Ministry of Environment, Agriculture, and Water (MEWA)
- Updating the National Spatial Strategy for the Kingdom of Saudi Arabia, IBI Group / Ministry of Municipality and Rural Affairs
- Strategic Environmental Assessment (SEA) Of The Capital Surface Transport Master Plan – Abu Dhabi
- Elaboration of a Strategic Sustainable Regional Development Plan (SSRDP) for Akkar (North Lebanon) and the related Strategic Environmental Assessment (SEA)
- Strategic Environmental Assessment for the Liwa Master Plan, Abu Dhabi, UPC.
- Environmental Impact Assessment for Qatar Chlorine Production Company (Messaeed Industrial City).
- Environmental Impact Assessment for a Q-ship Fabrication Yard in Qatar.
- Ecological Risk Assessment (based on biomonitoring study) for Qatalum (Messaeed Industrial City)
- Environmental Impact Assessment for the Iraq Basra Multi Division Project – Iraq (Cameron)
- Environmental Impact Assessment for the Green Line of Damascus Metro.
- Environmental Impact Assessment for Shawka Quarry in Ras El Khaima, UAE.
- Feasibility Study and EIA for groundwater supply and brine discharge of a major steel factory in Hamryah Free Zone, Sharja, UAE.
- Operational Environmental Management Plan for EMAL, Abu Dhabi (2009)
- Strategic Environmental Assessment and Land-Use Planning in Balou Baatara, North Lebanon.
- Strategic Environmental Assessment for the Jounieh Bay Boulevard, Lebanon.
- Air quality and noise impact assessment for the Tripoli Transportation Master Plan.

Climate Change, Clean Development Mechanism and Carbon Financing

- Team Leader of the Vulnerability, Adaptation and Mitigation Strategy for Lebanon as part of the Second National Communication for the UNCCD, Climate Change
- Identification, screening and development of CDM projects in oil and gas sectors, heavy industries (mainly cement), and power sector.

Delivering training and capacity building. Selected references:

- Clean Development Mechanism for the oil and gas sector, Euro-Mashreq Gas Project, Syria (2 days).
- CDM and Carbon Capture and Storage, Workshop, Reducing Emissions in the Oil and Gas Sector, Abu Dhabi, June 2008.

RICARDO KHOURY

- Environmental Impact Assessment for Gas sector stakeholders, EU project, March 2007 (Beirut and Damascus) and December 2007 (case study training – Homs).
- Team Leader in the preparation and delivery of a Global training program on Development of Integrated Financial Strategies to Combat Desertification, Global Mechanism/CCD (5 days program designed), and delivered in Tunis, Amman, Isfahan, Costa Rica, Cambodia, Sri Lanka, Lisboa.
- Operation and Maintenance of Wastewater Treatment Plants and EMP Implementation , Pontifical Mission/USAID, Chouf, Lebanon, June 2006 (2 days)
- Draft Law on Integrated Solid Waste Management in Lebanon, The World Bank, Beirut, March 2005 (2 days).
- Application of Environmental Legislation, EC LIFE, Beirut, May 2005 (2 days)
- Environmental Litigation, EC LIFE, Beirut, June 2005 (3 days)

2. AUB (2005-2007)

Title: Instructor

- Delivered the following course during spring 2005 and spring 2007: Non-Hazardous and Hazardous Waste Management, Faculty of Health Sciences.

3. AUB (June-1997, March- 2000)

Title: Research Assistant – Freelance Consultant

Experience included:

- Participated and implemented several research and consultancy projects related to the fields of water resources management, solid waste management and coastal zone management. In particular, coordinated the marine part of the Chekka submarine springs project, a major project in the water resources field in Lebanon and assisted in the implementation of a preliminary assessment of coastal waters in Lebanon and evaluation of Coastal Zone Management strategies for the country. Conducted also a feasibility study for artificial groundwater recharge in Ras-Beirut. Participated also to several environmental consultancy jobs.

PUBLICATIONS AND CONFERENCES (FROM RECENT TO OLDEST):

- **R. Khoury** and Alhaj D. –Strengthening Environmental Governance in the Oil and Gas Sector in Lebanon, Lebanese Center for Policy Studies (LCPS), 2016.
- **R. Khoury** – HSE Requirements and Practices of International Oil Companies (IOCs) - Speaker at the Lebanon International Oil and Gas Conference, December 2013
- Hydrocarbons Exploration and Development in the East Mediterranean, Wilton Park, UK – think tank discussions on HSE, export options and geopolitical context – invited to attend as HSE expert (2013) (invitation only event)
- **Khoury R.**, Maasri R., Bou Jawdeh I, and Kayal R., (2002), "Closure of an old dump in Lebanon: risk assessment and project formulation", Proceedings of Appropriate Environmental and Solid Waste Management and Technologies for Developing Countries Congress, organized by the International Solid Management Association (ISWA), Turkey, July 8-12.
- **Khoury R.**, Shazbak S. and Massoud M., (2002), "Air quality impact assessment for the Tripoli transportation master plan", Proceedings of Appropriate Environmental and Solid Waste Management and Technologies for Developing Countries Congress, organized by the International Solid Management Association (ISWA), Turkey, July 8-12.
- Abou-Ibrahim A. and **Khoury R.**, (2001), "Case study on the integrated and sustainable management of the coastal zone in Lebanon", Technical Report submitted to the United Nations Environment Program (UNEP).
- El Fadel M. and **Khoury R.**, (2001), "Status of the solid waste sector in Lebanon: Need for an integrated approach", Technical Report submitted to the United States Agency for International Development.
- El-Fadel M., Salhab S., and **Khoury R.**, (2001), "VOC emissions from landfills: formation mechanisms, modeling, measurement and control strategies", Technical Report submitted to the United States Agency for International Development.
- El-Fadel M. and **Khoury R.**, (2001), "Strategies for vehicle waste oil management: A case study", Resources, Conservation, and Recycling, 33, pp. 75-91.
- Ayoub G., **Khoury R.**, Ghannam J., Acra A., and Hamdar B., (2001), "Exploitation of submarine springs in Lebanon: Assessment of the potentials", Journal of Water Supply, Research and Technology - AQUA (in press).
- El-Fadel M., **Khoury R.**, Abou-Ibrahim A., Zeinati M., Sbayti H., Bou-Zeid E., (2000), "Preliminary characterization of the Lebanese coastal waters", Technical Report submitted to the United States Agency for International Development.
- Ayoub G., Ghannam J., **Khoury R.**, Acra A., and Hamdar B., (2000), "The submarine springs in the Chekka Bay, Lebanon: Delineation of salient features", Technical Report submitted to the International Development Research Center (IDRC), Ottawa, Canada.
- Sadek S., El-Fadel M., **Khoury R.**, and Ayoub G., (2000), "Settlement in seawater-saturated waste fills", Journal of Environmental Engineering Science, 17 (2), pp. 81-95.

- El-Fadel M. and **Khoury R., (2000)**, "Modeling settlement in MSW landfills: a critical review", Critical Reviews in Environmental Science and Technology, 30 (3), pp. 327-361.
- **Khoury R.**, El-Fadel M., Sadek S., and Ayoub G., (2000), "Temporal variation of leachate quality in seawater saturated fills", Advances in Environmental Research, 4, pp. 313-323.
- El-Fadel M., Sadek S., and **Khoury R., (1999)**, "Simulation of solid waste settlement in laboratory columns", Proceedings of the 7th International Waste Management and Landfill Symposium, Sardinia, Italy, Vol. III, pp. 521-529.
- El-Fadel M., **Khoury R.**, Sadek S., and Ayoub G., (1999), "Temporal variation of leachate quality in laboratory test cells", Proceedings of 15th International Conference on Solid Waste Management and Technology, Philadelphia.
- El-Fadel M., Sadek S., and **Khoury R., (1999)**, "Settlement and stabilization processes in municipal solid wastes", Technical Report submitted to the Lebanese National Council for Scientific Research (LNCSR).
- **Khoury R., (1999)**, "Seawater and leachate recirculation effects on physico-chemical processes in municipal solid waste", M.E. Thesis, American University of Beirut, Beirut, Lebanon.

LANGUAGES:

Language	Reading	Speaking	Writing
English	5	5	5
French	5	5	5
Arabic	4	4	2
Portuguese	5	5	5
Spanish	4	3	3

Proficiency is marked from 1 to 5, such that 1=basic & 5=fluent

CURRICULUM VITAE

Proposed role in the project:

1. **Family name:** Strmšnik
2. **First names:** Klemen
3. **Date of birth:** 9th December 1981
4. **Nationality:** Slovene
5. **Civil status:** Married with 2 children
6. **Education:**

DATE (FROM – TO)	INSTITUTION	DEGREE(S) OR DIPLOMA(S) OBTAINED:
October 2000 - November 2006	University of Ljubljana, Faculty of Arts, Department of Geography	B. Sc. Geography (according to national and EU legislation it is the same level of education as MSc. level under the Bologna reform)

7. **Language skills: Indicate competence on a scale of 1 to 5 (1 – excellent; 5 – basic)**

LANGUAGE	READING	SPEAKING	WRITING
Slovene		mother tongue	
English	1	1	2
Serbian / Bosnian / Croat / Montenegrin	1	1	2
German	4	4	4

8. **Membership of professional bodies:**

- Validated Lead and Ad-Hoc Expert of the URBACT Programme,
- Independent Evaluator for UNDP Regional Service Centre for Africa,
- Global Water Partnership (as an employee of ZaVita d.o.o.),
- Society of young Geographers of Slovenia and Ljubljana Geographic Society,
- European Geography Association (EGEA).

9. **Other skills: (e.g. Computer literacy, etc.):**

- Full computer literacy (MS Office, e-mail, internet).
- Advanced knowledge of database management and GIS (Idrisi, Surfer, Digger, Arc Map).
- Basic knowledge of several other modelling programs (AutoCad, IMMI) and publishing programs (Adobe InDesign CS).
- Excellent practical international experience in Project Cycle Management and Institutional and Civil Society Capacity Building.
- Practical international experience in implementation of EU and UNDP funded projects including practical implementation of EU PRAG procedures.

10. **Present position:** Project Manager ZaVita, svetovanje, d.o.o., Ljubljana, Slovenia

11. **Years within the firm:** July 2012 - present

12. **Key qualifications (Relevant to the project):**

Over 10 years of experience in:

- Sustainable Development Programming, Strategic Planning, and Public Policy.
- Evaluations of National Strategies, Policies and Action Plans.
- Strategic Environmental Assessments for various types of Programmes, Plans, and Policies.
- Environmental Impact Assessments for various types of Development and Infrastructure projects.
- Preparation of Environmental Analytical Documents and Baseline Studies – e.g. Environmental Vulnerability Studies, Pollution Risk Assessments, Flood Studies, Management of Agricultural areas in light of food self-sufficiency, etc.
- Management of natural resources – e.g. Management Plans for management of drinking water protection areas, River Basin Management Plans, Management Plans for recreational and tourism use of rivers, etc.
- Using GIS tools and GIS modeling in SEA, EIA, Spatial Planning, Rural Development, Protection of Nature & Environment and Environmental Monitoring.
- Planning and Management of Communal Infrastructure – e.g. Operational Programmes for treatment of communal wastewater, Programmes for providing communal infrastructure and utility services to building sites, etc.

- Establishment and Management of Protected Areas, Sustainable Development of services and products in Protected Areas, Development and Promotion of tourism related services and products in Protected Areas in the region of Western Balkans.
- Project Cycle management and Institutional Capacity Building, organizing and leading workshops and training with and for government officials and scientific community, workshops and presentations for the local population and other stakeholders (NGO's) of "specific problem areas" (including post-conflict areas in Western Balkans) and the general public.

Over 5 years of experience in:

- Business Process Reviews of legislative procedures and operational procedures in Environmental and Natural Resource Management Sectors.
- Evaluation of unnecessary Administrative Burdens of legislation and its procedures in Environmental and Natural Resource Management Sectors.
- Development, organization, and delivery of international level Training of Trainers.
- Guidance and Best-practice Manual development in environmental protection, spatial planning, and industrial risk management.

Additionally:

- Excellent knowledge of national Environmental Permitting systems and procedures, National Policy Priorities in the area of Environment, EU regulations and understanding of EU environmental policy.
- Excellent knowledge of Spatial Planning and Sustainable Development systems in Slovenia, Croatia, and Western Balkan countries.
- Extensive experience in development, application, and implementation of EU funded projects
- Advanced GIS skills and outstanding analytical (statistical, data, policy) and cartographic skills.
- Trainer of trainers with high motivational skills and proven track record.

13. Regional Experience:

EU COUNTRIES	PERIOD	WESTERN BALKANS COUNTRIES	PERIOD
Slovenia	2006 – on-going	Montenegro	2007, 2010 – on-going
Croatia	2010 – on-going	Bosnia and Herzegovina	2010 – on-going
Greece	2012-2013, 2018-on-going	Serbia	2011, 2014-2016, 2016-2017, 2018-on-going
Italy	2012-2013, 2018-on-going	Albania	2012-2013, 2014-2016
Slovakia	2015	Kosovo*	2014-2016
Austria	2016-2017, 2018-on-going	Macedonia	2014-2016, 2018
Hungary	2016-2017, 2018-on-going	MIDDLE EASTERN COUNTRIES	PERIOD
Poland	2018-on-going	Lebanon	2017, 2018-on-going
Portugal	2018-on-going	Turkey	2014-2016
Romania	2018-on-going		
Check Republic	2018-on-going		

14. Professional experience

Key reference projects linked to STRATEGIC ENVIRONMENTAL ASSESSMENTS (SEA) and APPROPRIATE ASSESSMENTS (AA) of various Strategies, Programmes and Plans – in addition to below stated most important references, Klemen Strmšnik led or participated in the implementation of over 15 SEAs for Spatial plans of various Cities and Municipalities.

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
March 2017 – May 2017	Lebanon	Lebanese Oil and Gas Initiative (LOGI) in co. with Publish What You Pay Mr. Georges Sassine; georges.sassine@logi-lebanon.org	Key Expert	The Review of the SEA for Petroleum Activities in Lebanese Waters
August 2016 – January 2018	Slovenia	City of Ljubljana Mr. Miran Gajšek; miran.gajsek@ljubljana.si	Team Member	SEA with AA for the changes and additions of the Spatial Plan of the City of Ljubljana
August 2016 – December 2016	Montenegro	Environmental Protection Agency of Montenegro Ms. Tamara Brajović; tamara.brajovic@epa.org.me	Member of the revision committee	The Review of the SEA for Hydrocarbon Exploration and Production in Offshore Montenegro
December 2015 – October 2016	Slovenia	Ministry of Environment and Spatial Planning Mr. Robert Grnjak; Robert.grnjak@gov.si	Deputy Team Leader	SEA with an AA of Water Management Plan for Danube and Adriatic water areas in Slovenia
December 2015 – June 2017	Slovenia	Ministry of Environment and Spatial Planning Ms. Barbara Breznik; Barabara.breznik@gov.si	Deputy Team Leader	SEA of Water Management Plan for the Adriatic Sea in Slovenia
September 2014 – December 2014	Croatia	Croatian Waters Ms. Vesna Trbojević; vesna@voda.hr	Team Member	SEA with AA for National plan for investments in public Wastewater and Drinking Water sectors in Croatia
November 2014 – July 2015	Croatia	Croatian Hydrocarbon Agency Ms. Barbara Dorić; info@azu.hr	Team Member	SEA with AA for Plan for exploration and exploitation of hydrocarbons in the Adriatic Sea in Croatia
August 2014 - August 2015	Slovenia, Croatia	Republic of Slovenia Government Office for Development and European Cohesion Policy Mr. Dimitrij Pur; dimitrij.pur@gov.si	Deputy Team Leader	Ex-Ante evaluation and SEA with AA for Cooperation Programme INTERREG V-A Slovenia – Croatia 2014-2020
December 2013 – August 2015	Slovenia	City of Ljubljana Mr. Miran Gajšek; miran.gajsek@ljubljana.si	Team Member	SEA with AA for the changes and additions of the Spatial Plan of the City of Ljubljana
May 2013 – July 2015	Slovenia	Ministry of agriculture and environment – Sector of forestry, hunting, and fishery Mr. Jošt Jakša; Jost.jaksa@gov.si	Team Member	SEA with AA for Operational Programme Fishery 2014-2020 of Republic of Slovenia
January 2013 – June 2013	Montenegro	Ministry of Agriculture and Rural Development Mr. Adem Fetić; adem.fetic@mpr.gov.me LUX Dev and FODEMO Mr. Ioannis Varelidis; ioannis.varelidis@luxdev.lu	Team Member	SEA for Forestry Strategy of Montenegro
June 2010 – 2012 Feb 2007 – Dec 2009	Slovenia	Slovene Road Authority Ms. Barbara Likar; +386 1 30 68 100	Team member	2 SEAs with AAs of the “3 rd Development Axis” – the new road connection of North to South of Slovenia – Central section (from Celje to Novo Mesto) and Southern section (from Novo Mesto to the border with Croatia)
August 2009 – November 2009	Slovenia	Geologija d.o.o. Mr. Jože Janež; joze.janez@geologija.si	Team member	2 SEAs of Water Management Plan for Danube water area in Slovenia and of Water Management Plans for Adriatic Sea water area in Slovenia

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
April 2006 – March 2007	Slovenia	Government Office for Local Self-Government and Regional Policy. Mr. Peter Wostner; +386-1-308-31-78	Team Member	Ex-ante evaluations and SEAs of the Operational Programmes for European Social Fund, European Regional Development Fund, and Cohesion Fund

Key reference projects linked to PROGRAMME MONITORING and various types of EVALUATIONS of strategic documents and large projects – in addition to bellow stated most important references, Klemen Strmšnik led or participated in the implementation of over 5 other similar monitoring or evaluation linked assignments.

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
September 2018 – on-going	Slovenia	Ministry of agriculture, forestry, and food – Sector of forestry, hunting, and fishery Mr. Jošt Jakša; Jost.jaksa@gov.si	Key Expert	Mid-term evaluation of the Operational Programme Fishery 2014-2020 of Republic of Slovenia
July 2018 – August 2018	Croatia	HRVATSKE ŠUME d.o.o. Jelica Jurendić, Jelica.Jurendic@hrsume.hr	Team Member	Feasibility Study for project Development of Forest Management Plans, which will adequately integrate Natura 2000 requirements
October 2017 – January 2018	Slovenia	Republic of Slovenia Government Office for Development and European Cohesion Policy Ms. Mirjam Tolar; mirjam.tolar@gov.si	Deputy Team Leader	Mid-term evaluation of the Contribution of NGO Capacity Building for Advocacy and performing of Public Services
September 2017 – October 2017	Croatia	IGH d.o.o. for Ministry of Environment and Energy Ms. Marija Herceg; marija.herceg@mzoe.hr	Key expert	Evaluation of the project proposal of the EU Cohesion project NATURAVITA
January 2016 – June 2016	Slovenia	City of Ljubljana Mr. Miran Gajšek; miran.gajsek@ljubljana.si	Team Member	Environmental Monitoring of implementation of the Spatial Plan of the City of Ljubljana
December 2015 – March 2016	Slovenia	Integra Ltd. in cooperation with Deloitte Mr. Jiří Dusík; jiri.dusik@integracons.com	Key Expert	Implementation of sustainable development horizontal priority in Slovenia - Country case study report
October 2015 – December 2015	Slovakia	Integra Ltd. for Slovak Ministry of Transport and Regional Development Mr. Jiří Dusík; jiri.dusik@integracons.com	Team Member	Design of methodology for consideration of risks arising from climate change during the development of infrastructure plans and projects in Slovakia
January 2015 – June 2015	Slovenia	Municipality of Ruše Ms. Barbara Ferlic; barbara.ferlic@ruse.si	Team Member	Environmental Monitoring of implementation of the Spatial Plan of the Municipality of Ruše
January 2015 – May 2015	Turkey	Integra Ltd. in cooperation with Eptisa Ltd. Mr. Jiří Dusík; jiri.dusik@integracons.com	Key Expert	Report on SEA/EIA organizational structures in 4 EU Member States
August 2014 - August 2015	Slovenia, Croatia	Republic of Slovenia Government Office for Development and European Cohesion Policy Mr. Dimitrij Pur; dimitrij.pur@gov.si	Deputy Team Leader	Ex-Ante evaluation and SEA with AA for Cooperation Programme INTERREG V-A Slovenia – Croatia 2014-2020
August 2010 – August 2013	Slovenia	Government Office for local self-management and regional policy Mr. Peter Wostner; peter.wostner@gov.si	Team Member	On-going monitoring and the Mid-term evaluation of the European regional development fund OP, European social fund OP and Cohesion fund OP and

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
				for the Cross-border cooperation programs in Slovenia for the period 2007-2013
July 2010 – December 2010	Slovenia	Ministry of Public Administration Ms. Renata Zatler; renate.zatler@gov.si	Key expert	Standard Cost Model for the Environmental legal system of the Republic of Slovenia
May 2010 – May 2013 (active until June 2012)	Slovenia	Ministry for agriculture, forestry, and food Ms. Marija Markeš; marija.markes@gov.si	Team member	On-going monitoring of the National strategic plan for rural development 2007-2013 and the Mid-term evaluation of the Rural development plan 2007-2013
August 2009 - November 2009	Slovenia	DIEM Mr. Gregory Vilchek; Vilchek@diem.ru	Team Member	Feasibility Study for South Stream - Environmental Aspects of the Slovenian section of the pipeline
April 2006 – March 2007	Slovenia	Government Office for Local Self-Government and Regional Policy Mr. Peter Wostner; +386-1-308-31-78	Team Member	Ex-ante evaluations and SEAs of the Operational Programmes for European Social Fund, European Regional Development Fund, and Cohesion Fund

Key reference projects linked to INSTITUTIONAL CAPACITY BUILDINGS and development of GUIDELINES & MANUALS:

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
November 2016 – on-going	Slovenia	Ministry of Environment and Spatial Planning Vesna Kolar-Planinšič; Vesna.Kolar-Planinsic@gov.si	Team member	Expert support and technical assistance in project Training strategy for Strategic Environmental Assessment and Environmental Impact Assessment SEA/EIA – workshops and guidance on various topics (e. g. SEVESO Directive, Climate Changes, Strategic thinking, Spatial Planning, etc.)
February 2018 – April 2018	Macedonia	United Nations Development Programme Metodija Sazdov; metodija.sazdov@undp.org	Deputy Team Leader	Conducting a focused capacity building program and supporting the development of projects within the framework of the project “Improving the Management of Protected Areas”
December 2016 – December 2017	Slovenia	Ministry of Environment and Spatial Planning Vesna Kolar-Planinšič; Vesna.Kolar-Planinsic@gov.si	Team member	Guidance for siting of SEVESO installations in Slovenia – best practices for Spatial planners and SEA/EIA evaluators.
December 2016 – December 2017	Slovenia	Ministry of Environment and Spatial Planning Vesna Kolar-Planinšič; Vesna.Kolar-Planinsic@gov.si	Team member	Development of Guidelines for best practice SEA implementation in Spatial Planning Sector
May 2014 – December 2014	CLO, CRO, BIH, SRB, MNE, MCD	WWF- Mediterranean Programme Office Leon Kebe; lkebe@wwfmedpo.org	Deputy Team Leader	Preparation of the project idea Dinaric Arc Parks – Climate Adaptation Project “DAP-CAP” (within project Dinaric Arc Parks)
August 2014 – September 2016	TUR, CRO, BIH, SRB, MNE, KOS, MCD, ALB	Hulla & Co Human Dynamics KG Ruža Radović; ruza.radovic@humandynamics.org	Team member	Capacity building on SEA/EIA within the project Environment and Climate Regional Accession Network – ECRAN

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
October 2012 – June 2014	Croatia	EPTISA Servicios de Ingenieria S.L. Marko Cacanowski; mcacanowski@eptisa.com	Team member	Strengthening capacities for Strategic environmental assessment at the regional and local level:
May 2011– June 2012	Serbia	GIZ Serbia Office Daniela Kostadinova; daniela.kostadinova@giz.de	Team Member	Project-Cycle-Management Trainings according to EU Standards within the project Municipal Economic Development in the Danube Region (GIZ Serbia)
2010-2011	Croatia	Udruga “Kako zelena je moja dolina” Zorka Jovetić; Zorka.jovetic@gmail.com	Team member	Capacity building for sound management of areas of outstanding natural value – Dretulja
May 2010 – December 2010	BIH, CRO, MNE	Center for environmentally sustainable development (CESD) Irem Silajdzic; irem.silajdzic@heis.com.ba	Team Member	Capacity building for sound management of areas of outstanding natural value

Key reference projects linked to ENVIRONMENTAL IMPACT ASSESSMENTS of various development projects – in addition to below stated most important references, Klemen Strmšnik led or participated in the implementation of 4 other EIAs for projects on a local, regional and national level.

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
January 2016 – on-going	Slovenia	Grasto d.o.o. for Strabag Slovenia Mr. Milorad Ivić; milorad.ivic@strabag.com Mr. Dejan Kiš; dejan.kis@strabag.com	Deputy Team Leader	SEA, EIA and Environmental Permit Procedure for changes of operations and sanitation plan in Lukovica Quarry
January 2012 – May 2012	Slovenia	Municipality of Črnomelj Ms. Greta Auguštin; greta.augustin@crnomelj.si	Key expert	Environmental aspects and recommendation for the revitalization of water mills and development of small hydropower installations on rivers in Bela Krajina
March 2010 – May 2010	Slovenia	PP Energija d.d. Mr. Bojan Pahor; bojan.pahor@ppenergija.si	Team Member	EIA for construction and operation of a system for capturing emissions of chicken manure on the site Draženci
2008-September 2010	Slovenia	DARS d.d. – Slovene Highway Authority Ms. Mojca Novak	Team Member	EIA for 17-km Highway Section A4 Draženci – Gruškovje Intl. Border Crossing
April 2007 – January 2008	Slovenia	Mariborski vodovod javno podjetje d.d. Ms. Alenka Cajnkar; alenka.cajnkar@mb-vodovod.si	Team Member	EIA for drinking water pumping station on Selniška Dobrava with regional pipeline
August 2006 – May 2007	Slovenia	Municipality of Divača Ms. Nataša Macarol; natasa.macarol@divaca.si	Team Member	EIA for the Business Development Zone Risnik
June 2006 – December 2007	Slovenia	Termit d.d. Ms. Alenka Pavlin; Alenka.Pavlin@termit.si	Team Member	EIA for deposition of inert waste in Hudej-Ples quartz stone quarry

Key reference projects linked to SUSTAINABLE DEVELOPMENT and MANAGEMENT OF NATURAL RESOURCES – in addition to below stated most important references, Klemen Strmšnik led or participated in the implementation of over 10 other similar sustainable development and management of natural resources linked assignments.

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
December 2018 – on-going	Slovenia, Italy, Hungary, Poland, Portugal, France	URBACT Secretariat - CGET Kristijan Radojčić; k.radojic@urbact.eu	Lead Network Expert	Lead Network Expert of the URBACT project BeePathNet – phase 2 https://www.ljubljana.si/en/ljubljana-for-you/environmental-protection/the-bee-path/
September 2018 – on-going	SLO, CRO, SRB, AT, HUN, ROM, UK, MNE, CZ, BIH	City of Ljubljana Luka Sešel; luka.sesel@ljubljana.si	Team Leader	Expert support and technical assistance in the implementation of the project Management and utilization of Urban Forests as Natural Heritage in Danube Cities (URBforDAN) http://www.interreg-danube.eu/approved-projects/urbfordan
April 2018 – on-going	Croatia	Oikon d. o. o. for the City of Labin Tena Birov; tbirov@oikon.hr	Key Expert	Landscape Protection and Development Study for the southern coastline of the City of Labin
April 2018 – October 2018	SLO, ITA, HUN, POL, POR, GRE	URBACT Secretariat - CGET Kristijan Radojčić; k.radojic@urbact.eu	Lead Network Expert	Lead Network Expert of the URBACT project BeePathNet – Phase 1
December 2017 – on-going	Slovenia, Croatia	ZRC-SAZU Mateja Breg Valjavec; mateja.breg@zrc-sazu.si	Team Member	Evaluation of tourism services offer of the new KRASn'KRŠ sustainable tourism destination (KRASn'KRŠ project)
December 2017 – on-going	Slovenia, Croatia	The Institute of RS for Nature Conservation M.Sc. Barbara Vidmar; barbara.vidmar@zrsvn.si	Team Member	Development Plan for recreational activities on the Karst Edge (Living on the Karst Edge – LIKE project)
December 2017 – on-going	Slovenia	Slovenian Forestry Institute Primož Simončič primož.simoncic@gjs.gov.si	Team Member	Expert support and technical assistance in the implementation of the ForBioEnergy project
August 2017 – October 2018	Slovenia	Municipality of Kamnik Barbara Strajnar; Barbara.Strajnar@kamnik.si	Team Member	Development of a Traffic Regime for the sustainable tourism destination Velika planina
August 2017 – on-going	SLO, CRO, BIH, MNE, SRB, ROM, AT, GER, HUN	Slovenia Forest Service Dragan Matjašič; Dragan.Matjasic@zgs.gov.si	Team Member	Ecosystem services of karst protected areas – driving force of local sustainable development (ECO KARST)
December 2016 – May 2018	ALB, KOS*, MCD, MNE	UNDP and UNECE in co. with Global Water Partnership – GWP-Med/MIOECSDE Vladimir Stavrić; vladimir.stavric@gwpmed.org	Deputy Team Leader	TRANSBOUNDARY DIAGNOSTIC ANALYSIS - Thematic report on Biodiversity and Ecosystems for the Drin River
June 2016 – January 2017	Bosnia and Herzegovina	Institute for the Protection of Cultural-Historical and Natural Heritage of Canton Sarajevo Selma Karačević Kapić; selma.k@spomenici-sa.ba	Team member	The management plan of Protected Landscape Parc Trebević
November 2015 – November 2016	Croatia	United Nations Development Programme in Croatia Valentina Futac; valentina.futac@undp.org	Team member	Market-based pricing strategy for Croatian National parks and Nature parks in the Republic of Croatia
August 2014 – December 2015	Croatia	Agencija za zaštitu okoliša Gordana Kolačko gordana.kolacko@azo.hr	Team member	GIS as a tool for determination of pressures and threats to protected areas in Croatia

DATE FROM – DATE TO	LOCATION	COMPANY & REFERENCE PERSON (NAME & CONTACT DETAILS)	POSITION	DESCRIPTION
July 2014 – March 2015	Slovenia	Slovenian Forestry Institute Primož Simončič; primoz.simoncic@gis.gov.si	Team Member	Expert assistance in the development of local forestry production chains – project “For Posavski Forrest and Wood”
August 2013 – February 2014	Slovenia	WWF Austria Irena Kavčič; irena.kavcic@wwf.panda.org	Team Member	Sustainable development of selected activities in Soča and Idrija valley in respect to ecosystem services
April 2013 – November 2013	Montenegro	UNDP Montenegro Borko Vulikić; Borko.vulikic@undp.org	Team Member	Plan for using Tara river resources
May 2011 – December 2011	Montenegro	LUX Dev and FODEMO Ioannis Varelidis; ioannis.varelidis@luxdev.lu	Team member	Business Process Review and Forest Information System Design
March 2011 - June 2012	Montenegro, Croatia, Slovenia	City of Dubrovnik Biserka Simatović; bsimatovic@dubrovnik.hr	Team Member	Providing project management and technical assistance for the implementation of the CBC IPA ADRIATIC project „Adria.MOVE IT“, the City of Dubrovnik with municipalities of Umag, Novigrad, Lopar, Kotor, and Piran
January 2011 – September 2011	Slovenia	Municipality of Velika Polana Irena Jeneš; uprava@velika-polana.si	Team Member	CeRamiCa – Market research, Policy recommendations and Development plan for small crafts and pottery sector in Pomurje region
November 2010 - April 2012	Slovenia	Government Office for local self-management and regional policy and Project office of the Government of the RS in Pomurje region Kruno Karlovčec; kruno.karlovcec@gov.si	Team Member	Support in preparation and implementation of regional development projects in Pomurje region in Slovenia
November 2010 – January 2011	Slovenia	City of Koper Georgi Bangiev; georgij.bangijev@koper.si	Team Leader	Management of Agricultural land in light of food self-sufficiency for the City of Koper
June 2010 – July 2010	Slovenia	City of Koper Georgi Bangiev; georgi.bangiev@koper.si	Team Member	Vision and strategic framework for the development of recreation & sports infrastructure and services in the City of Koper
February 2010 – May 2012	Slovenia, Croatia	Municipality of Črnomelj Greta Auguštin; greta.augustin@crnomelj.si	Deputy Team Leader	Preparation of expert studies and management model for management of river Kolpa, project “Curs Colapis”
2007-2008	Slovenia, Croatia	Municipality of Ruše Andrej Gašparič; Andrej.gasparic@ruse.si	Team Member	ProjectKaPo – Interreg IIIA – Preparation of Management plan for Visitors
December 2006 – May 2007	Slovenia	Logarska dolina d.o.o. Dušan Prašnikar; logarska@siol.net	Team Member	Sustainable development in Kamniško-Savinjske Alps – studies and analysis for the establishment of the regional park
December 2006	Slovenia	RRC Koper Slavko Mezek; slavko.mezek@rrc-kp.si	Team Member	The conception of Spatial Development of South Primorska region and the Programme of Measures for Implementation

15. Other relevant information (e.g. Publications):

A: Publications:

1. The effectiveness of the SEA process in Slovenia (S. Cepuš, K. Strmšnik, M. Harmel, A. Krajnc, M. Premelč, E. Harmel, S. Weldt), for the Journal Impact assessment and Project Appraisal, 2019. URL: <https://doi.org/10.1080/14615517.2019.1595934>
2. Valuation of recreation related ecosystem services on rivers Soča (Slovenia) and Tara (Montenegro) (J. Stritih, M. Harmel, K. Strmšnik); prepared for ForumAlpinum 2018 and the 7th Water Conference, Austria, 2018.
3. Environmental Impact of Petroleum Activities in Lebanon – Review of the Strategic Environmental Assessment (SEA); Lebanese Oil & Gas Initiative in cooperation with Publish What You Pay and The Friderich-Erbert-Stiftung (FES); Beirut, 2017. URL: https://logi-lebanon.org/uploaded/2017/10/5ODZQNGI_SEA%20Report%20final.pdf
4. Training Manual on SEA/EIA (M. Smutny, M. Cashmore, K. Strmšnik); prepared within EU-funded project ECRAN implemented by Human Dynamics, 2014. URL: http://www.ecranetwork.org/Files/ToT_training_manual.pdf
5. Guidance for high quality SEA implementation in Spatial Planning sector; Ministry of Environment and Spatial Planning, Ljubljana, 2017.
6. Environmental aspects and guidelines for appropriate revitalization of mills on watercourses of Bela Krajina and placement of small hydropower plants, EGES, no. 3/2012, Ljubljana, 2012.
7. The management of agricultural land in the spatial planning process in regards to self- sufficiency of area of the City Municipality of Koper with food, Glasnik UP ZRS, Letnik 16, 2011, 4, Koper, 2011.
8. Public opinion of citizens of Municipality of Koper about Luka Koper, Dela 26, University of Ljubljana, Faculty of Arts, Department of Geography, Ljubljana, 2006.

B: Seminars:

1. 3rd Regional Conference on Environmental Impact Assessment, Croatia – Marta Brkić, September 2017.
2. Training on "Modul 7: SEA, AA and Municipal Land-use Plans" as a part of the Training Strategy for SEA and EIA 2015-2020; Ministry of Environment and Spatial Planning, Ljubljana, March 2017.
3. 2nd Regional Conference on Environmental Impact Assessment, Croatia – Marta Brkić, September 2015.
4. 1st Regional Conference on Environmental Impact Assessment, Croatia – Marta Brkić, September 2013.
5. Symposium: 4th Days of Melik: Geographical views on sea and space management in coastal area of Slovenia; University of Koper, Faculty of Humanities Koper– Anton Gosar, June 2011.
6. Communitary tax and preparation of Programs of supplying services to construction land plots; Agencija za kadre – contact person: mag. Antonija Štucin, October 2009.
7. How to determine prices of obligatory public services and public services of environmental protection; Agencija za kadre – contact person: mag. Antonija Štucin, September 2009.
8. Problems in process of preparation of Programs of supplying services to construction land plots and Communitary tax; Agencija za kadre – contact person: mag. Antonija Štucin, June 2009.
9. The new national coordinate system in Slovenia and AutoCAD, Jure Špiler, 2008.
10. Introduction to ArcGIS 2, GISDATA d.o.o. 2007.
11. Introduction to ArcGIS 1, GISDATA d.o.o., 2007.

C: Lectures:

1. 3rd Regional Conference on Environmental Impact Assessment, Croatia: The appropriateness and quality of Monitoring Indicators – Lessons learned from Monitoring Reports – Marta Brkić, September 2017.
2. Klemen Strmšnik, 2016: Training for students of University of Zagreb – Development and Implementation of EU Funded Projects, Ljubljana, June 2016, dr. Gojko Bezovan.
3. Klemen Strmšnik, 2015: Training for students of University of Ljubljana, Faculty of arts, Department of Geography - Applicative Geography in Environmental and Regional Development sector, Ljubljana, January 2015, dr. Blaž Repe.
4. Klemen Strmšnik, 2015: Is SEA really »only« a tool for mitigation of the negative impacts? What about the other side of the coin...; Lecture on the 2nd Regional Conference on Environmental Impact Assessment, Novi Vinodolski, Croatia, September 2015 – Marta Brkić.
5. Klemen Strmšnik, 2013: Financing Natura 2000 – More and better opportunities from EU funding 2014-2020, Zagreb, October 2013. WWF Germany – Andrea Stefan.
6. Klemen Strmšnik, 2011: The management of agricultural land in the spatial planning process in regards to self- sufficiency of area of the City Municipality of Koper with food. University of Koper, Faculty of Humanities Koper – g. Anton Gosar.
7. Klemen Strmšnik, 2006: New Zealand (for students of geography - 3rd year) University of Ljubljana, Faculty of Arts, Department of Geography (Tatjana Resnik Planinc, BrE, AmE, PhD in geographical sciences).

PERSONAL DATA:

NAME: Dima Alhaj
Place/Date of Birth: Damascus, April 25, 1982
NATIONALITY: Syrian
Phone No.: +963-933-230378
JOB TITLE Deputy General Manager of ELARD-Syria/ Senior Project Manager

KEY QUALIFICATIONS & EXPERTISE:

- Projects management;
- Preparation of environmental and social studies including Environmental, Social and Health Impact Assessment (ESHIA), Environmental Site Assessment (ESA), Strategic Environmental Assessment (SEA) and Environmental, Social and Health Baseline studies (ESHB);
- Water quality and water resources management studies;
- Designing infrastructure potable water, irrigation, fire fighting, surface water drainage and sewage networks;
- Designing sanitary, plumbing and firefighting interior networks;
- Surface water modeling;
- Software used included HEC-HMS, WaterCAD, MDCad, WinDes Micro Drainage, AutoCAD, SPSS, Statistica and Microsoft Office (Word, Excel, PowerPoint, Project);
- Member of the Syrian Engineers Syndicate;
- Accredited EIA expert from the Syrian Ministry of Environment.

EDUCATION

<i>Institution</i>	Damascus University, Faculty of Civil Engineering, Department of Environment.
<i>Date from - date to</i>	2000 - 2006
<i>Degree or Diploma obtained</i>	Bachelor of Civil Engineering, Environment
<i>Institution</i>	Syrian Virtual University
<i>Date from - date to</i>	2014- 2016
<i>Degree or Diploma obtained</i>	Master's Degree in Business Administration

EXPERIENCE RECORD:**1. Earth Link and Advanced Resources Development (ELARD)****September 2009 - to date*****Title: Deputy General Manager of ELARD Syria; Senior Project Manager******Experience includes:***

- Strategic Environmental Assessment (SEA) for Hydrocarbon E&P Activities in Offshore Montenegro, Client: Ministry of Economy in Montenegro, 2014-2016. (Project manager).
- Environmental, Social and Health Impact Assessment (ESHIA) for the Iraq 800 km Crude Oil Export Pipeline and the associated five pump stations (meeting IFC and EIB standards for financing), Client: Oil Projects Company in Iraq (SCOP)& SNC Lavalin, 2013-2015. (Project manager).
- Environmental and Social Impact Assessment (ESIA) for the Missan Crude Oil Export Pipeline (MOEP) for PetroChina, Iraq, 2013. (Project manager)
- Environmental baseline surveys for Block 4 and Block 9 offshore Lebanon (with Creoccean), Client: Total E&P, 2019-ongoing.
- Environmental, Social and Health Impact Assessment for the 3D seismic exploration activities offshore Syria; client: SNG EAST MED S.A, 2015 (project manager).
- Institutional, legal and policy framework analysis and Health, Safety and Environment (HSE) plan preparation for the 3D seismic exploration activities offshore Syria; client: SNG EAST MED S.A, 2015. (project manager)
- Strategic Environmental Assessment (SEA) for Al Ghab Development Programme (AGROPOLIS), UNDP, Syria, 2010-2011. (Team leader assistant)
- Environmental, Social and Health baseline studies (ESHBS) for Missan oil fields in Iraq, client: CNOOC, 2015. (Project manager)
- Health, Safety and Environment (HSE) gap analysis and action plan study for the offshore petroleum sector in Lebanon client: UNDP, 2015. (Environmental expert)
- Environmental Baseline surveys for Lukoil well pads expansion and hook-up of historical wells, West Qurna (phase 2), Iraq, 2019-ongoing (project manager)
- Environmental & Social Impact Assessment Study (ESIA) for DEZGAS Gas Plant and the Associated Upgrading Facilities, for TOTAL E&P SYRIE, Syria, Deir Ezzor (2011). (Project Manager)
- Environmental and Social Impact Assessment (ESIA) for the Activities of Petro Canada in Block 2 in Deir Ezzor, Syria, 2011. (Project Manager)

- Social and Environmental Baseline Study Report and the Policy, Legal and Administrative Framework Report for Altayyem Combined Cycle Power Plant in Deir Ezzor, 2011. (Project Manager)
- Environmental and Social Impact Assessment (ESIA) for the Activities of Petro Canada in Block 2 in Al Hasakeh, Syria, 2010. (Project Manager)
- EIA for the Activities of Hayyan Petroleum Company in Palmyra Block in Syria, 2010. (Assistant Project Manager)
- Update of the Environmental regulations in KSA, Client: Booz Allen Hamilton -Ministry of Environment, Water, and Agriculture Kingdom of Saudi Arabia (2018-ongoing)
- Environmental impact assessment for the activities of Central Cement Company in Syria, 2019-ongoing (project manager)
- Biodiversity, socio-economy and archaeology baseline survey for Tawke and Peshkabir oil fields in Kurdistan, Iraq. Client: BUREAU VERITAS- UAE / DNO, 2018 (Project manager).
- Biodiversity, socio-economy, archaeology and hydrogeology baseline survey for Miran and Bina Bawi oil fields in Kurdistan, Iraq. Client: BUREAU VERITAS- UAE / GENEL Energy, 2018 (Project manager).
- Update of the Strategic Environmental Assessment (SEA) for Exploration and Production Activities Offshore Lebanon. Client: Lebanese Petroleum Administration, 2018- ongoing (SEA Expert).
- Identification of pollution sources and causes of eutrophication in Al-Sin Lake, Ministry of Water Resources, Syria, 2016- 2017 (Environmental backstopping expert & peer reviewer of final deliverables).
- Local Economy and Labour Market Survey in Salamieh District, The Aga Khan Foundation -Syria, 2017- 2018 (Project manager).
- Development of the health, safety and environment (HSE) framework for the oil & gas sector in Lebanon, UNDP, Lebanon, 2016-2017 (Environmental backstopping expert).
- Social, health, archaeological and environmental baseline survey for DNO Peshkabir oilfield in Kurdistan, Iraq, client: BV UAE, 2017 (Project manager).
- Social, health, archaeological and environmental baseline surveys for Atrush oilfield ESIA study in Iraq, client: BUREAU VERITAS- UAE, 2016 (Project manager).
- Knowledge, Attitude and Practice (KAP) Baseline Survey for WASH components in Damascus primary schools, Oxfam, Syria, 2017, (Project manager).
- The Development of Water Resources Management Strategy in Khabour and Tigris Basin in Syria, Client: General Commission of Water Resources, 2012-2014.

- Environmental Impact Assessment (EIA) for Cameron New Aftermarket Base in Basra, Iraq (2012). (Project Manager)
- Phase 1 and Phase 2 – Environmental Site Assessment Reports for Cameron New Aftermarket Base in Basra, Iraq (2012). (Project Manager)
- Feasibility Study on Protection of the Figh Spring System, 2009-2010. My responsibilities included the evaluation of the existing sewage infrastructure in the protection zone of the spring, and the recommendation of complementary infrastructure measures for the protection of Ain al Figh.
- Feasibility Study for Providing Water to Lafarge Cement Factory in Aleppo from the Euphrates River, 2009. (my responsibilities included the preliminary engineering design and assessment of alternatives)

2. Halcrow Group Limited (a CH2MHILL Company)

Jan 2007- August 2009

Title: Environment Engineer

Experience includes:

- Preparation of shop drawings for the sanitary and plumbing networks and utilities for Qatar Prime Minister's Palace in Sabboura, Syria, 2009.
- The design of sanitary, plumbing and firefighting interior networks and storm water infrastructure network (including BOQs and technical specifications) for Syrian Metal Industry Project in Adraa, Syria, 2009.
- The conceptual design of sanitary and plumbing networks and utilities for the Water Park Project in Yaafour, Syria, 2009.
- The design of sanitary, plumbing and fire fighting interior networks and utilities (including BOQs and technical specifications)for M1, M2, M3 & M4 buildings at the Eighth Gate master plan project in Sabboura, EMAAR-IGO, Syria, 2008.
- The design of sanitary, plumbing and fire fighting interior networks and utilities (including BOQs and technical specifications)for Massar Underground Car Park, Damascus, Syria, 2008.
- The design of sewage, storm water, potable water and firefighting infrastructure networks (including BOQs and technical specifications) for The Eighth Gate Infrastructure Project in Sabboura, EMAAR-IGO, Syria, 2007.
- The design of the surface water drainage network (including BOQs and technical specifications) for the Eighth Gate External Roads Project, Sabboura, EMAAR-IGO, Syria, 2007.

- One and a half month on-job training in Halcrow Sharjah office. The training included designing water, irrigation and fire fighting networks for Marjan Island Project and the Golf Club Project, UAE, Sharjah, 2007.

LANGUAGES:

Proficiency is marked from 1 to 5, such that 1=basic & 5=fluent.

Language	Reading	Speaking	Writing
Arabic	5	5	5
English	4	4	4

PUBLICATIONS:

Strengthening Environmental Governance of the Oil and Gas Sector in Lebanon, Lebanese Center for Policy Studies.

Policy Paper, May 26, 2016.

http://lcps-lebanon.org/publications/1464090554-ricardo-dima_eng_web.pdf

Policy Brief, Jul 1, 2016:

http://lcps-lebanon.org/publications/1467358066-policy_brief_21_web.pdf

PROPOSED POSITION: PETROLEUM EXPERT

Years of experience: 15

PERSONAL DATA:

Family Name: Ghanem
First Name: Rachad
Nationality: Lebanese
Date of birth: 8/7/1980
Civil Status: Married

KEY QUALIFICATIONS & EXPERTISE:

Mr. Ghanem, is a geologist and petroleum engineer with 15 years of experience in multi-disciplinary fields including petroleum engineering (Exploration and production), environment geology and hydrogeology.

He has experience in conducting Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) studies for oil and gas explorations projects as well as large water infrastructure projects, such as waste water treatment and water conveyor/tunnels.

Mr. Ghanem engages in delivery of specific technical O&G training courses and E&P software to national oil companies and within educational institutions.

He manages numerous water resources assessment projects that include hydrogeological investigations, water monitoring network, and the installation and testing of deep wells.

- Computer Skills: Microsoft office (Word, Excel, Publisher, PowerPoint, Project), Map info, Adobe Photoshop, AutoCAD, Voxler (Golden Software) → Data analysis and 3D visualization, Surfer (Golden Software) → Contour maps, girding and volume calculations, Strater (Golden Software) → Borehole logging, RockWorks17 and PETREL→2D and 3D static, structural and numerical modeling and graphic presentations, Logplot7, GW-Base and Ecrin/KAPPA Workstation: Saphir for pressure Transient Analysis, Topaze for rate transient analysis, Rubis for full field reservoir simulation, Amethyste for well performance analysis, PETEX (GAP) for, PROSPER, WELLCAD and PowerLog for log processing and petrophysical evaluation.
- Workstation skills: Unix, Geoframe, ELAN, CMR (processing & interpretation), MRX (processing & interpretation), DSI (processing & interpretation), MSIP, WellPix, Evaluation using ECS & PEX), MIRTH

Mr. Ghanem is member of the Society of Petroleum Engineers (SPW), Society of Petrophysicists and Well Log Analysts (SPWLA) and the American Association of Petroleum Geologists (AAPG).

He is also a member of the Regional Technical Training Committee (RTTC) at the Society of Petroleum Engineers - SPE Middle East, Africa and South Asia.

EDUCATION

- **Bachelor of Sciences (BS)** in Geology - American University of Beirut, Lebanon (2002)
- **Post Graduate Diploma in Petroleum Engineering** - Institute of Petroleum Eng. - Heriot WATT University, Scotland, UK (2012)

TRAINING

- **DCS Reservoir Characterization course in MLC-Abu-Dhabi (1.5 months):**
 - Basic introduction to integrated reservoir analysis.
 - Practical aspects of analysis and integration of data from distinct sources and disciplines for Reservoir characterization. Integrating this data and mapping for the purpose of reservoir visualization.
 - Understanding of well log data acquisition
 - Basic working knowledge of the GeoFrame platform and key log data handling modules, such as Data Loading, Well Edit, Well Composite and Data Function
 - A basic knowledge of log interpretation ("Petrophysics"), Review of Archie's water saturation equation with associated input parameters and well log data.
 - Recognizing primary fluids and reservoir types.
 - Introduction to Shear and Compressional theory, A basic working knowledge of processing sonic waveform data to obtain DT compressional and DT shear.
 - Using and creating dispersion plots.
 - Basics of Bore hole Geology. A working knowledge of Formation Micro Image processing and basic interpretation required to pick dips, identify faults and fractures.
 - Basic understanding of Geomechanics, rock strength and breakout, stress direction.
 - An understanding of the methodologies available to calculate rock properties from sonic data.
 - Basic knowledge and skills of cartography and time to depth comparisons.
 - Loading well data, (curves, locations, header info, parameters etc in Petrel.
 - Correlating formation markers faults and creating cross-sections in Petrel
 - Load simple 3d seismic data and post well data (Petrel)
 - Basic understanding of a synthetic and VSP.
 - Basic interpretation skills of surface seismic and faults. (Petrel)

- Ability to visualize a seismic project in Petrel, summarize results and provide a presentation with recommendations
- **DCS Petrophyscis course in MLC-Abu-Dhabi (1 month):**
 - Resistivity theory and tools (Physics of induction and laterolog)
 - Resistivity inversion in MIRTH (resistivity modeling)
 - Nuclear theory and tools' processing (Physics of Neutron and density)
 - Spectroscopy (ECS and spectrolith)
 - NMR (Nuclear magnetometric resonance theory), CMR tool processing
 - MRF (Fluid characterization)
 - Interpretation using cross-plots of neutron-density
 - Petrophysical evaluation of shaly sand and carbonate reservoirs using singl-well and multi-well ELAN (Elemental analysis module).
- **OFS-3 Managing and Leading your people – Kuala Lumpur (1 week)**
 - Effective communication, developing self-awareness and listening skills.
 - Preparing and delivering short, influencing presentations with clarity and impact
 - Managing effectively the performance of others through:
 - Objective setting and delegation
 - Motivation
 - Giving performance-based feedback which reflects the personality & needs of the individual(s) concerned
 - Working effectively as a member of a group, and when leading, demonstrate appropriate style flexibility
 - Demonstrating ways of resolving interpersonal and intergroup conflict
 - Preparation and implementation of realistic personal development plans

EXPERIENCE RECORD (FROM RECENT TO OLDEST):**1. LOGS (ELARD sister company) (2014 to Present)**

Title: General Manager (Petroleum Engineer)

Responsibilities:

- Company management and Business Development
- Company service expansion and partnership build-up
- Delivery of technical courses for oil & gas industry (Upstream)

Projects managed and involved in:

- **Generation of the 3D Onshore Geological Model of Lebanon** - (Project initiator, Manager and Executer). Product was presented at both AAPG technical conferences organized in Lebanon during May 2013 and May 2014.
- **Magneto -Telluric geophysical survey in northern Lebanon** acquired on behalf of ZONGE and NEOS (2015).
- **Well Testing Course** delivered in January 2014 to South Oil Company and Iraqi Ministry of Oil staff in February 2014 (using Ecrin Software from KAPPA)
- Public course on **Basics of Formation Evaluation (Petrophysics)** delivered to geology graduates of the AUB in July 2014.
- **Integrated production Modeling Course** delivered in December 2014 to South Oil Company and Iraqi Ministry of Oil staff in December 2014 (using GAP and PROSPER software from PETEX).
- **Thermal Lining Course** delivered to South Oil Company and Iraqi Ministry of Oil staff in July 2014 (using GAP and PROSPER software from PETEX).

2. ELARD (2009- 2014)

Title: Senior Geologist/ Senior Project Manager

- **Strategic Environmental Assessment of Hydrocarbon E&P Activities in Offshore Montenegro**, Ministry of Economy (Montenegro) (Mar. '14 – Jun. '15)- E&P Expert.
- **Strategic Environmental Assessment of Lebanon's Renewable Energy Sector Project**, UNDP (Nov. '13 – Nov. '14) - E&P Expert.
- **Hydrogeological Study and well survey in priority cazas** - 2016 - UNICEF, Lebanon - Project Manager.
- **Hydrogeological Assessment of groundwater resources within Atrush Block** - Kurdistan for TAQA Global -2013- Project Manager.
- **National Groundwater Assessment of Lebanon – UNDP –2011 to 2014** -Assistant Project Manager and Task Leader for the Establishment of the National Groundwater Database
- **Generation of the 3D Onshore Geological Model of Lebanon** - internal Project at ELARD and LOGS(Project Manager and Executer).
- **Expansion of the groundwater monitoring network within the Upper Litani Basin – IRG** 2013 -(Project Manager).
- **Groundwater Modeling of the Litani River Basin – IRG** 2013– Project Manager.
- **Borehole video recording of 7 wells in Wadi Jilo – DEP – 2012** - Project Manager
- **Environmental Impact Assessment of the Nassiriyah Refinery in Iraq – SCOP – 2011 – 2012** -Task leader of Geological and hydrogeological baseline and impact assessment.

- Remedial Investigation, Feasibility Study, and development of Tender documents for the remediation of oil sludge pits, for all the Exploration wells of INA-Hayan Company (Croatian oil Company)- 2011-Project Manager
- Pre and Post Excavation Sampling for oil Exploration Wells for Shell in Syria -2011-Project Manager
- Environmental Impact Assessment for exploration wells for Shell in Syria – Project Manager
- Site Assessment , and Phase 1 Site investigation for a proposed Pharmaceutical Industrial Facility in the Kingdom of Saudi Arabia (Sanofil- Aventis)- 2011-Project Manager
- Environment Impact and Social Assessment for Exploration Wells, and Seismic Survey, for Two oil Concession Blocks for Petro-Canada, in Syria – 2010- Project Manager
- Baseline Survey and Environmental Impact and Social Assessment for the Proposed EBLA Gas Treatment Plant – Assistant Project Manager
- Well Survey and groundwater level monitoring within the Upper Litani Basin – IRG (LRBMS Project)– 2010-(Project Manager)
- Set-up of automated surface water a groundwater monitoring system in the Upper Litani Basin – IRG (LRBMS Project) - 2010 - (Project Manager)
- Assess of ground water Resources- EMAAR Sabboura Development, Syria '11 (Project Manager)
- MAF Sabboura Infrastructure, Well Diagnosis , (Project Manager)
- Update of Quarry Permit Application, Aug. '10 – Sept.'10 (Project Manager)
- Preparation of a Master Plan for the Closure and Rehabilitation of Uncontrolled Dumps in Lebanon Oct'10 – Jun'11 (Project Manager)
- Environmental Impact Assessment for the Awali Water Conveyer- Apr '10-Aug '10(Project Manager)
- EIA for the Construction and Operation of Karbala Oil Refinery at the Front-End Engineering Design (FEED) stage (Technip – Italy), 2010 (Responsible for the Water sector)
- Feasibility Study on the Protection of Figeih Spring, – 2010
Responsible for writing the main sections of the Final Report, and the establishment of the groundwater data base of the entire catchment area which extend over 1000 km²

3. Schlumberger Oilfield Services – Qatar Geomarket (2008-2009)

Title: Data and Consulting Services Segment, worked as a Petrophysicist

North Field Petrophysical Evaluation Project (Qatar)

Responsibility:

- Involved in the final petrophysical evaluation of over 150 open-hole wells in the north Field gas reservoir.

- Quality control of wireline logs prior to processing
- Environmental corrections of data (Preplus Module)
- Log depth matching (Well edit Module)
- Generation of different log cross-plots (Pterostat Module)
- Single well ELAN (Elemental analysis) processing
- Interpretation and petrophysical evaluation
- Reservoir Summation (Ressum Module)
- Reporting

4. Qatar Dredging Company Q.S.C (2006-2008)

Head Office (Soil Investigation Department) worked as Geologist / Project Engineer

- **The Wave Project (Muscat, Oman):** Offshore Vibrocore drilling campaign in relation to project tender
- **The Saadiyat Island Project (Abu Dhabi, UAE):** Offshore Vibrocore drilling campaign and Core-drilling campaign in Umm El Nar Channel in relation to tender preparation)
- **Khalifa Port and Industrial Zone Project (Taweelah, UAE):** Offshore, onshore borehole drilling campaigns, resistivity study and tender preparation
- **The Pearl Qatar (Doha, Qatar):** onshore and offshore drilling campaigns
- **Al Raha Beach Development (Abu Dhabi, UAE):** Vibrocore and borehole drilling campaigns.
- **Responsibilities:**
 - Managed and supervised soil investigation campaigns in the gulf and the middle east
 - Prepared desk studies for prospective soil investigation campaigns
 - Assessed internal budget estimates of drilling campaigns
 - Prepared quotations for clients
 - Supervised and coordinated mobilization and demobilization of all drilling equipment into and out of site areas; managed all related logistic activities
 - Supervised field operations (vibrocore, light cable percussion drilling, wire-line core drilling and resistivity studies)
 - Operated (seabed SVC500) vibrocore machine
 - Logged Boreholes in field
 - Produced borehole logs using Strater Software
 - Advanced log interpretation and analysis
 - Created systematical database for all soil investigation projects
 - Produce iso-contour and iso-thickness maps
 - Compute soil/rock volumes
 - Created 2D graphic soil presentation and cross-sections

- Created 3D geological Models
- Prepared invoices to clients
- Prepared Pre-qualification and tender documents as part of project engineering work

Occupied the position of Acting Director on The pearl Qatar project during the project's last 2 months

5. Qatar Dredging Company Q.S.C (2005-2006)

Title: Geotechnical Engineer

Managed soil investigation activities on the project site, organized borehole campaigns by coordinating with client and local subcontractors. Interpreted, analyzed borehole logs and updated soil testing database. Designed, programmed and launched the in-house borehole and vibrocore logging templates for QDC using the software Strater. Produced iso-contour maps, iso-thickness maps and computed Soil/Rock volume calculations for client using Surfer Software. Managed soil improvement activities (compaction and Surcharge + vertical wick-drains). Organized all pre- and post-soil improvement testing on site by coordinating with client and local subcontractors. Assessed and evaluated the degree of soil improvement and compared between the efficiency of different types of compactors. Organized Cone penetrometer testing, interpreted CPT logs and reported them to client. Designed and launched QDC in-house CPT logging template using Golog Software of A.P. Vandenberg CPT rig (Hyson 200 KN). Calculated residual settlement out of CPT data and reported it to client. Produced progress drawings for compaction and all kinds of testing on site for client

6. Baker Hughes INTEQ UAE (2003)

Title: Mud logger Trainee

- Rig up task of mud-logging equipment in Sharjah Port,UAE
- On (Noble Dick Favor) rig for Chevron Company
- Logging job offshore Qatar on (Noble Gene House) rig for Maerisk Oil Company
- Logging job offshore Qatar on (Noble Charles Copeland) rig for Maerisk Oil Company

Independent Consultancy Experience

7. Holy Spirit University of Kaslik (USEK) (September 2015 - present)

Title: Part time instructor

Responsibilities: Teaching Upstream O&G courses:

- Petroleum Geology
- Introduction to Oil & Gas Lifecycle
- Drilling Engineering
- Reservoir Characterization (petrophysics and well testing)
- Reservoir simulation and Production

8. Lebanese American University (September 2016 - present)**Title:** Part time instructor**Responsibilities:** Teaching Upstream O&G courses:

- Petroleum Geology
- Formation Evaluation and Logging
- Modeling and Computer Applications

9. Paradigm Middle East (Jan 2013 – 2014)**Title:** *Training Consultant***Responsibilities:** Providing theoretical and practical (software) training courses

- Petroleum Geology & Geological Modeling
- Reservoir Simulation
- Geostatistics
- Formation Evaluation (Petrophysics)
- Production Management & Engineering

LANGUAGE SKILLS

	Reading	Speaking	Writing
English	5	5	5
French	5	5	5
Arabic	5	5	5

Proficiency is marked from 1 to 5, such that 1=basic & 5=fluent

PERSONAL DATA:

Family Name: Nader
First Name: Manal
Date of birth: August 10, 1969
Civil Status: Married

EDUCATION

- **Doctor of Philosophy in Biology and Aquaculture** - Department of Marine Biological Science, Graduate School of Fisheries Science, Hokkaido University, Japan - March, 2000.
- **Master of Science in Aquaculture** - Institute of Aquaculture, University of Stirling, Scotland - February, 1994.
- **Bachelor of Science in Fisheries and Wildlife Management** - Department of Fisheries and Wildlife, College of Natural Resources, University of Minnesota, U.S.A. (March, 1991)

EXPERIENCE RECORD:

Current Academic Rank:

- **Director** of the **Marine Resources and Coastal Zone Management Program** at the Institute of the Environment, University of Balamand
- **Director** of the **Institute of the Environment** at the University of Balamand
- **Coordinator** of the **Master in Environmental Science** at the **Department of Environmental Sciences** at the Faculty of Sciences, University of Balamand
- **Associate Professor**, Faculty of Sciences, University of Balamand

Consulting Experience:

- Earth Link and Advanced Resources Development: 2003-present
- Food and Agriculture Organization: 2011
- RPS Energy Limited, UK: 2011
- United Nation Development Program-Lebanon: 2011
- Regional Activity Centre For Specially Protected Area-ECAP: 2010, 2002
- MORES-Lebanon: 2009
- EI-EMC International: 2009
- Private Consultant-Aquaculture: 2000-present

SELECTED RELEVANT ACTIVITIES

- October 2018 – March 2020: Partner for the project “Developing a Labelling Scheme for Mediterranean Small-scale and Artisanal Fish Products” (LabMAF) funded by the EU.
- September 2018 – October 2018: Project manager for the project entitled “Socio-economic assessment of the fisheries sector in Anfeh” funded by the municipality of Anfeh.
- March 2018 – February 2020: Senior Project Manager for the project entitled “Promoting marine biodiversity and improving fishery potential and marine ecotourism activities through the deployment of Artificial Reefs off the Lebanese coast”, funded by the European Commission.
- September 2017 – August 2018: Senior Project Manager for the project entitled “Identification of fauna and flora diversity in Jourd Tannourine”, funded by the Municipality of Tannourine.
- September 2017 – December 2017: Senior Project Manager for the project entitled “Master Plan Development for Jourd Tannourine”, funded by the Municipality of Tannourine.
- January 2016 – December 2017: Senior Project Manager for the project entitled “Enhancing Food Security and Agricultural Livelihoods in Crisis-Affected Areas of Akkar”, funded by ACTED under a call from the European Commission.
- January 2016 – December 2016: Project Manager for the project entitled the “Implementation of a Pilot Case Study on the Ecosystem Approach to Fisheries in Lebanon”, funded by Food and Agriculture Organization of the United Nations (FAO).
- April 2015 – March 2018: Senior Project Manager for the project entitled “Sustainable Action for Bioenergy Production in Koura (SABioP)”, funded by the European Commission.
- April 2015 – August 2015: Project Manager for the project entitled “Scoping report of the Awali basin and coastal area and TORs for their integrated management plan” (Awali project) funded by MIO-ECSDE Host Institute for GWP-Med within the framework of the “GEF Medpartnership”.
- August 2014 – March 2015: Project Manager for the National consultancy for the identification of legal, policy and institutional gaps and policy reforms drafted for marine and coastal biodiversity protection part of the Project “Market policy and legislative development for mainstreaming the sustainable management of marine and coastal ecosystems in Lebanon”, funded by GEF and the Ministry of Environment.
- 2012 – 2013: Project Manager for the project entitled “Pilot survey on fisheries dependent data collection in Lebanon including training (PO 299074)” funded by the EastMed Project and FAO.
- March 2012-June 2012: Project Manager for the Deployment of an artificial reef in Abdeh marine waters, North Lebanon, Lebanon funded by Lions/Rotary-Lebanon.
- October 2011-October 2012: Project Manager for the Environmental Resources Monitoring Project funded by the United Nations Environmental Program
- March 2011-Present: Project manager for Evaluating Coastal Risk on the Chekka El Heri beach through the assessment of the physical oceanographic parameters funded by the University of Balamand Research Council.

- January 2010-January 2014: Developed the section related to Lebanon, and was appointed Senior Project Manager by the University of Balamand for the "People for Ecosystem Based Governance in Assessing Sustainable Development of Ocean and Coast" (PEGASO) funded by Large-scale integrating project, FP7-European Commission (FP7-ENV.2009.2.2.1.4 Integrated Coastal Zone Management) for a total value of 8.970.397 € (<http://www.pegasoproject.eu/>).
- February 2009: Contributed to the report entitled "Sustainable fisheries in the Mediterranean" commissioned under the CP/RAC of the Mediterranean Action Plan (MAP) of the United Nation Environment Programme (UNEP) and financed by the Spanish Ministry for Environment.
- June 2008: Wrote the chapter on Lebanon for the report entitled "State of World Marine Capture Fisheries Management: Mediterranean/Black/Caspian Seas Report" commissioned by the Economics and Policy Division (FIE), Department of Fisheries & Aquaculture; Food and Agriculture Organization, United Nations.
- October 2007-Present: Designed, developed, introduced and was appointed coordinator of the Master in Environmental Science Program at the Department of Environmental Sciences at the Faculty of Science at the University of Balamand, Lebanon.
- October 2007-December 2007: Developed the proposal, including the status report, for the launching of an Air Quality Monitoring Program at the Institute of the Environment, University of Balamand
- January 2006-June 2009: Wrote the proposal for, and was appointed as Senior Project Manager of, the project entitled "Integrated Management of East Mediterranean Coastlines" funded by the European Commission. The project is expected to end in January 2009 and is implemented in the Mohafaza of North Lebanon (EuropeAid 121336/C/G/Multi) for a total value of 1,255,000 EURO.
- July 2005-December 2005: Collection and identification of solid wastes caught off the coast of El Mina & Tripoli. Funding secured from RAMOGE, Monaco, and in cooperation with MED-POL.
- May 2005-Present: Tagging and monitoring of marine turtles on the Palm Island Nature Reserve and the Tyre Coast nature Reserve, Lebanon. Turtles are being tagged; data is being collected on turtle species visiting the reserve, nesting behavior, survival and recruitment.
- January 2005-Present: Consultant for Earth Link and Advanced Resources Development (ELRAD) for an Environmental Impact Assessment for the development of a recreational resort on the coast of Khalde, Lebanon entitled "Khalde Tourist Resort".
- October 2004-Present: Assessment of Commercial Fish Species Project. This activity is evaluating fish species landings and the socio-economic state of the fishing community by administering a survey to fishermen in the major fishing ports in Lebanon. Species type, quantity and economic value are being assessed, and fishing effort calculated.
- October 2004-Present: Assessment of Shark Species Project. This activity will concentrate on listing all species and the quantity caught by fishermen off the Lebanese coast. It will be carried-out in conjunction with Activity I above (for justification, please refer to Annex I). Photographs will be taken, species identified and a booklet generated.

MANAL NADER, Ph.D.

- January, 2004-March 2006: Solicited funding for, and was appointed Project Director for producing a web-based software application to continue activities on the project entitled "Development of a Monitoring System for Environmental Indicators for the Country of Lebanon" at the University of Balamand. (AMIDEAST Grant # 61/2003).
- August, 2003-Present: Developed and currently implementing a project entitled "Developing Wildlife Ecotourism at the Al-Shouf Cedar Nature Reserve and Horsh Ehden Nature Reserve, Lebanon". The project involves introducing radiotelemetry and wildlife tracking and monitoring methodologies to Lebanon, develop ecotourism plans as well as raise the awareness of surrounding communities to the importance of wildlife conservation.
- May, 2003-December, 2005: Project coordinator for an initiative at the University of Balamand entitled "Efficient Management of Wastewater, Its Treatment and Reuse in the Mediterranean Countries. EU Project # ME8/AIDCO/2001/0515/59641-P044".
- October, 2000 -present: Developed a curriculum for, built the infrastructure of and introduced a Bachelor of Sciences Degree in Environmental Sciences and initiated a Department of Environmental Sciences at the University of Balamand.
- October, 2000 – August 2007: Designed, developed, introduced, launched, chaired and upgraded the Department of Environmental Sciences at the Faculty of Science at the University of Balamand, Lebanon.

SELECTED RELEVANT EXPERIENCE

- Nov 2015 – May 2016: Consultant for the Lebanese Ministry of Environment (MOE) on the project entitled "Updating the 2002 SAP-BIO National Report for the Country of Lebanon" under the project "Market Policy and Legislative Development for Mainstreaming the Sustainable Management of Marine and Coastal Ecosystems in Lebanon" funded by the Global Environment Facility (GEF), implemented by the United Nations Environment Program (UNEP), and executed by the MOE.
- Apr 2015 – Dec 2015: Consultant for the National Council for Scientific Research – CNRS, Lebanon Center for Remote Sensing on the project entitled "Generating a Risk and Ecological Analysis Toolkit for the Mediterranean (GREAT Med)" funded by ENPI.
- Nov 2003-Present: Consultant for Earth Link and Advanced Resources Development (ELRAD) for Environmental Impact Assessments of construction projects in coastal areas.
- Jun 2002-Aug 2002: Senior consultant; commissioned by the Ministry of Environment-Lebanon and the Regional Activity Center for Specially Protected Areas-Mediterranean Action Plan to develop "Priority Action Plan 1: Establish Conservation Strategies for Coastal Habitats" of the "National Report on Marine Biodiversity for the country of Lebanon".
- Nov 2001-Jun 2002: Senior consultant; commissioned by the Ministry of Environment-Lebanon and the Regional Activity Center for Specially Protected Areas-Mediterranean Action Plan to develop the "National Report on Marine Biodiversity for the country of Lebanon".
- Dec 2000-Dec 2002: Project Director for "the Development of a Monitoring System for Environmental Indicators for the Country of Lebanon" at the University of Balamand and in collaboration with the University of Athens. Planning and holding of seminars and workshops for focal points and partners.

PUBLICATIONS

Peer-reviewed journal articles, conference proceedings, and reports:

- Mitri, G., and Nader, M. 2018. FireLab: an operational tool for improved monitoring and management of fire risk in Lebanon. In. 24th International Scientific Conference of the Lebanese Association for Advancement of Science « Sciences, Social Equity and Sustainable Development » 25-26 April. 17-18
- Gebrael, K., Saba, S., Mitri, G., and Nader, M. 2018. Assessment of socio-economic factors affecting community participation in reforestation activities and sustainable forest/land management practices in Mounjez, Lebanon. In. 24th International Scientific Conference of the Lebanese Association for Advancement of Science « Sciences, Social Equity and Sustainable Development » 25-26 April. 23-24..
- Karaan, M., Mitri, G., and Nader, M. 2018. Assessment of seasonal and annual allergenic type of pollen in North Lebanon between 2008 and 2012. In. 24th International Scientific Conference of the Lebanese Association for Advancement of Science « Sciences, Social Equity and Sustainable Development » 25-26 April. 574-576..
- Mitri, G., Sakr, R., Saba, S., Nader, M., Nasrallah, G. 2018. Use of field hyperspectral data for monitoring water stress in native tree seedlings. In. 24th International Scientific Conference of the Lebanese Association for Advancement of Science « Sciences, Social Equity and Sustainable Development » 25-26 April. 307-308.
- Saba, S., Gebrael, K., Bou Nassar, M., Mitri, G., Nader, M. 2018. Assessment of socio-economic factors affecting energy consumption for residential heating in the Caza of Koura, Lebanon. In. 24th International Scientific Conference of the Lebanese Association for Advancement of Science « Sciences, Social Equity and Sustainable Development » 25-26 April. 116-117.
- Mitri, G., Nader, M. and Lea, K 2017. Mapping burned areas from time series of Landsat imagery for estimating greenhouse gas emissions at the National level. 11th EArsel forest fires SIG workshop: New Trends in Forest Fire Research Incorporating Big Data and Climate Change Modeling 25-27 September 2017, Chania, Greece, Pp.43.
- Mitri, G., Saba, S., Nader, M., and McWethy, D. 2017. Developing Lebanon's fire danger forecast. International Journal of Disaster Risk Reduction, 24, 332-339.
- Food and Agriculture Organization of the United Nations (FAO) (2017). The implementation of a pilot case study on the Ecosystem Approach to Fisheries in Lebanon. Management Plan for the Purse Seine Sardine Fishery in Lebanon. Prepared by Marine and Coastal Resources Program, Institute of the Environment, University of Balamand, 2017.
- Nader M. and Abou Dagher M. (2016). Development of an integrated coastal zone management law in Lebanon. Book of abstracts, The 3rd International Conference on Coastal Zone Engineering and Management in the Middle East (Arabian Coast 2016), 20 to 23 November 2016 (pp. 26-27) Dubai, UAE.
- FAO (2016). The implementation of a pilot case study on the Ecosystem Approach to Fisheries in Lebanon. Purse Seine Fisheries: Baseline Report. Prepared by Marine and Coastal Resources Program, Institute of the Environment, University of Balamand, 2016.
- MOE/GEF (2016). Updating the 2002 SAP-BIO National Report for the Country of Lebanon. Prepared by Nader M., and Talhouk S. May 2016.

- Boustany L., El Indary S., Nader M. (2015). Biological characteristics of the Lessepsian pufferfish *Lagocephalus scleratus* (Gmelin, 1789) off Lebanon. *Cahier de Biologie Marine*, 56:137-142.
- Abbas, N. H., Van der Molen, I., Nader, M. R., & Lovett, J. C (2014). Trust and Cooperation relations in environmental management of Lebanon. *The European Scientific Journal* (ESJ). In print
- Issa S.T., Van der Molen I., Nader, M., and Lovett, J. Empowerment, Agency, and Opportunity Structure: a Case of Lebanon. *POLITSCI'13 Political Science Conference: Political Science in the 21st Century - New Opportunities and Impasses/Theorizing and Experiencing Politics (Proceedings)*, 31 October - 2 November 2013, Turkey.
- Issa S.T., Van der Molen I., Nader, M., and Lovett, J. (2014). Spatial Variation of Vulnerability in Geographic Areas of North Lebanon. *MIFS Conference -1st Mediterranean Interdisciplinary Forum on Social Sciences and Humanities (Proceedings)*, 23-26 April 2014, Lebanon / *European Scientific Journal* (ESJ).
- Nader MR, Indary S and Moniri NR. (2014). Historical fisheries catch reconstruction for Lebanon (GSA 27), 1950-2010. Fisheries Centre, University of British Columbia, Vancouver (Canada). Fisheries Centre Working Paper #2014-11, 19 p.
- Abbas, N. H., Van der Molen, I., Nader, M. R., & Lovett, J. C. (2013). Perceptions from the Public and Private Sector on Trust and Cooperation in the Field of Environmental Management in Lebanon. *Academic Journal of Interdisciplinary Studies*, 2(8) : 571.
- Abbas, N., Van der Molen, I., Nader, M., and Lovett, J. (2013). Perceptions from the Public and Private Sector on Trust and Cooperation in the Field of Environmental Management in Lebanon. *Conference Proceedings of the 3rd International Conference on Human and Social Sciences (ICHSS 2013)*. Rome, Italy, 20 – 22 September 2013.
- Nader, M., El Indary, S. and Stamatopolous, C. Assessment of the commercial fish species of the coast of North Lebanon 2006-2011. *INOC-CNRS, International Conference on "Land-Sea Interactions in the Coastal Zone" – Jounieh (Lebanon)* 06-08 November 2012.
- Al Daia, R.; Nader, M. and Saab, G. Environmental value of the North Lebanon Coastline. *INOC-CNRS, International Conference on "Land-Sea Interactions in the Coastal Zone" – Jounieh (Lebanon)* 06-08 November 2012.
- Mitri, G., Nader, M., Van der Molen, I. and Lovett, J. (2012). Evaluating fire risk associated with repetitive armed conflicts. *Modelling Fire Behaviour and Risk*, Spano, D., Bacciu, V., and Sirca, C. (Eds.). *DipNeT and IAFENT*, Sassari, Italy. Pp. 205-210.
- Mitri, G., Nader, M., Van der Molen, I. and Lovett, J. (2012). Monitoring Landcover changes on the coastal zone of North Lebanon using Object-Based Image Analysis of multi-temporal Landsat images. *1st Workshop on Temporal Analysis of Satellite Images* (Ban, Y., Ed.), 24 - 25 May 2012, Mykonos Island, Greece.
- Meliadou, A., Santoro, F., Nader M., Abou Dagher M., Al Indary S., and Abi Salloum B. Prioritizing coastal zone management issues through fuzzy cognitive mapping approach. *Journal of Environmental Management*, Volume 97: 56-68 (2012).
- Abou-Dagher M., Nader M.R. and El Indary S. Evolution of the coast of North Lebanon from 1962 – 2007: mapping changes for the identifications of hotspots and for future management interventions; *Fourth Symposium "Monitoring of Mediterranean coastal*

areas: problems and measurement techniques" - Livorno (Italy) 12-13-14 June 2012; Conference Proceedings.

- Mitri, G., Nader, M. and Salloum, L. 2011. Fuel type mapping in the Mediterranean region of North Lebanon using Object-Based Image Analysis of ASTER imagery. In 8th International Workshop on Advances in Remote Sensing and GIS Applications in Forest Fire Management Remote sensing of forest fires, from local to global assessments 20-21 October 2011, Stresa, Italy.
- Mitri, G., Nader, M., Van der Molen, I. and Lovett, J. 2011. The use of satellite imagery for the assessment of fire risk associated with repetitive armed conflicts in North Lebanon. In: International Conference on Fire Behaviour and Risk Modelling, Alghero, 4-6- October 2011. Italy
- Nader M. R., Indary SE, Salloum BA, Dagher MA (2011) Combining non-invasive methods for the rapid assessment of mammalian richness in a transect-quadrat survey scheme – Case Study of the Horsh Ehdén Nature Reserve, North Lebanon. ZooKeys 119: 63–71. doi: 10.3897/zookeys.119.1040
- Nader M.R. & Indary S. First record of *Diadema setosum* (Leske, 1778) (Echinodermata, Echinoidea, Diadematidae) from Lebanon, Eastern Mediterranean. Aquatic Invasions, Vol. 6, Suppl. 1: S23–S25 (2011)
- Nader M.R., Salloum B.A. and Karam N. Environment and sustainable development indicators in Lebanon: A practical municipal level approach, Ecol. Indic. Vol. 8, no. 5, pp 771-777 (2007).
- Marie Abboud-Abi Saab & Manal Nader. "Establish Conservation Strategies for Lebanese Coastal Habitats," International Workshop on Marine & Coastal Protected Areas, Meknes-Morocco, March 2005.
- M. Nader and A. Abche "Review of Forest Fire Management in Lebanon," Conference REUNIR, Damascus, Syria, October 4 – October 8 2002.
- Manal R. Nader and Marie Abboud-Abi Saab. Establish Conservation Strategies for Coastal Habitats. Project for the preparation of a Strategic Action Plan for the conservation of biological diversity in the Mediterranean region, SAP-BIO-Lebanon (RAC/SPA), August 2002.
- Manal R. Nader and Salma N. Talhouk. National Report of the Country of Lebanon. Project for the preparation of a Strategic Action Plan for the conservation of biological diversity in the Mediterranean region, SAP BIO-Lebanon (RAC/SPA), June 2002.
- Nobutaka Ando, Takeshi Miura, Manal R. Nader, Chiemi Miura and Kohei Yamauchi. A method for estimating the number of mitotic divisions in fish testes. Fisheries Science, vol. 66, Issue 2, pp. 299 (2000).
- Manal R. Nader, Takeshi Miura, Nobutaka Ando, Chiemi Miura and Kohei Yamauchi. Recombinant human insulin-like growth factor I stimulates all stages of 11-ketotestosterone-induced spermatogenesis in the Japanese eel, *Anguilla japonica*, In vitro. Biology of Reproduction, v. 61, n. 4, pp. 944-947 (1999).
- Manal R. Nader, Takeshi Miura, Nobutaka Ando, Chiemi Miura and Kohei Yamauchi. Insulin-like growth factor I in combination with 11-ketotestosterone stimulates all stages of spermatogenesis in the testis of the Japanese eel in vitro. In: Proceedings of the Sixty-Ninth Annual Meeting of the Zoological Society of Japan; Zoological Science, December 1998, vol. 15 (supplement): pp.67.

MANAL NADER, Ph.D.

- Takeshi Miura, Chiemi Miura, Takashi Ohta, Manal R. Nader, Takashi Todo and Kohei Yamauchi. Estrogen is essential for the renewal of spermatogonial stem cells in males. *Biochemical and Biophysical Research Communications*, vol. 264, n. 1, pp. 230-234 (1999).

Chapters in books:

- Manal R. Nader, Shadi Indary, and Manale Abou Dagher (2015). Chapter 4: North Lebanon – Bio-Physical, Social, Economic and Political Features of the Study Area. In Irma van der Molen and Nora Stel (Eds.), *Conflict and Environment in North Lebanon Vulnerability and Resilience from a Multi-Disciplinary Perspective* (pp. 55 – 106). Enschede, The Netherlands: Ispkamp Drukkers.

PERSONAL DATA:

Family Name: Afif
First Name: Charbel
Date of birth: January 11, 1981
Nationality Lebanese

Consulting Interests

- Emission inventories
- Air dispersion modeling
- Ambient air quality
- Air quality network design & implementation
- Stack emissions
- Air pollution instrumentation
- Noise impact assessment
- Safety and Hygiene in chemistry labs
- Chemical risk management
- Strategic Environmental Assessment

Research Interests

- Behavior of volatile organic compounds
- Measurement of primary & secondary aerosols
- OH radical budget
- Nitrous acid budget
- Source apportionment in atmospheric pollution
- Development of sampling techniques
- Development of analytical techniques
- Emission inventories
- Air pollution modeling
- Metrology
- Noise impacts

EDUCATION

- **Habilitation à Diriger les Recherches** in Atmospheric Chemistry and Physics, East Paris University – France, December 2018
- **Ph.D. in Chemistry**, Saint Joseph University (USJ) -Lebanon, January 2008
- **Ph.D. in Atmospheric Chemistry and Physics**, Paris 12 University – France, January 2008
Dissertation Title: Etude de la chimie troposphérique en milieu urbain : rôle de l'acide nitreux. *Implication of HONO in the tropospheric chemistry of urban environments.*
- **M.S. in in Atmospheric Chemistry and Physics**, Paris 12 University (France), 2004
Thesis Title: Qualification du système de prélèvement de HONO, développement d'un système étalon de génération de HONO. *Qualification of a nitrous acid sampling system and development of standard generation system of gaseous nitrous acid.*

- **B.S. and “Maîtrise” in General Chemistry**, Saint Joseph University (USJ) -Lebanon, 2003

EXPERIENCE RECORD:

Jan. 2018 – Present	Associate Adjunct Professor – The Cyprus Institute, Cyprus
Sep. 2017 – Present	Associate Professor – Saint Joseph University, Lebanon
Nov. 2015 – Present	Sworn Environmental expert (Ministry of Justice Decision No. 3330/2015)
Sept. 2013 – Present	Director of the Master “Industrial technology”, Faculty of sciences - Saint Joseph University, Lebanon
Sept. 2010 – Present	Director of the Emissions, Measurements, and modeling of the Atmosphere (EMMA) laboratory affiliated to the Center for Analysis and Research CAR, Faculty of sciences - Saint Joseph University, Lebanon
Sept. 2010 – Present	Technical director of the Center for Analysis and Research CAR, Faculty of sciences - Saint Joseph University, Lebanon
Sept. 2009 – Present	Assistant professor, Faculty of sciences - Saint Joseph University, Lebanon
2004 – Present	Freelance consultant, Air Quality Management services
Jul. 2009 – Aug. 2009	Research engineer, French National Council for Scientific Research, France
Feb. 2009 – Jun. 2009	Lecturer, Faculty of sciences - Saint Joseph University, Lebanon
Feb. 2008 – Feb. 2009	Researcher, Laboratoire Inter-universitaire des Systèmes Atmosphériques, France
May 2008 – Jun. 2008	Lecturer, Paris 12 University, France

Consulting and Management Experience**Consultant, Air quality management services, 2004 – present**

- Main clients: Municipalities (Dubai, Beirut, Tripoli), Environmental consultancy companies, NGOs, Industries, UNIDO, Ministry of Environment, UNDP, EU, World Bank.
- Services provided:
 - Air quality network design and implementation: Design of network and number of sites, monitoring methods and instruments, implementation of sites, data analysis and interpretation.
 - Ambient air quality measurement for long periods with low frequency and short periods with high frequency (depending on pollutants). Measured pollutants: PM10, PM2.5, NO2, O3, SO2, VOCs, CO & CO2
 - Training and capacity building on ambient air quality measurement and analysis (sampling and lab analysis)
 - Emission inventories according to the EEA/EMEP, AP-42 and IPCC methodologies for different sectors (transport, energy, maritime navigation,...)
 - Greenhouse Gas emissions assessment
 - Stack emissions measurement through third parties according to European Norms
 - Air dispersion modeling (SLAB, AERMOD, CALINE, ADMS-4, CALPUFF,...) from point source, line source, surface area and volume source: Air Toxics

Modeling, Modeling Studies for source apportionment with multiple sources and emission variation, Accidental Release Modeling, Odour, determination of stack height, etc. (Waste-to-energy combustion, cement industries, steel industries, power plants,...).

- Indoor air quality measurements and compliance
- Air quality in workplaces: identification of pollution sources and solution offering
- Instrumentation and regulations
- Measurement and instrumentation metrology
- Exposure Assessment and Risk Analyses
- Air Quality Control Equipment Evaluations
- Compliance assessment

A list of projects conducted in the last 3 years (2016-2018).

Client	Project	Date
Armenian Ministry of Justice – ELARD Rep. of Armenia	Third party assessment of the ESIA and EIA of Amsulsar Gold Mine project in the Republic of Armenia	2019 - ongoing
Booz Allen Hamilton - Ministry of Environment, Water, and Agriculture Kingdom of Saudi Arabia	Update of the Environmental regulations of KSA In charge of the Air quality and Emissions sections	2018-ongoing
ECODIT – Tripoli Special Economic Zone Authority Lebanon	Air quality assessment for the Strategic Environmental Assessment of Tripoli Special Economic Zone	2018 - ongoing
Lebanon Petroleum Authority - ELARD	Air Quality assessment part of the Update of the Strategic Environmental Assessment for the offshore Exploration and Production Activities in Lebanon	2018 - ongoing
MoEW-EDL-MVV Decon Lebanon	Air emissions and dispersion modeling for the EIA of Zouk and Jiyeh Power plants	2017-ongoing
MoEW-EDL-MVV Decon Lebanon	Air quality and emissions reporting to EKF for Zouk and Jiyeh Power Plants including	2017 - ongoing
UNDP Lebanon	Industrial air emissions expert for the Lebanon Environmental Pollution Abatement Project	2017 - ongoing
American University of Beirut Medical Center - ELARD	Air dispersion modeling for the EIA of the installation of a healthcare waste incinerator for the AUBMC	2019
Dany Doumit Lebanon	Air dispersion Modeling (EIA) - Jdeideh Incinerator	2018-2019
Ramboll USA – Sustainable Akkar Lebanon	Air quality and climate change assessment for the Sustainable Akkar and Lebanon Wind Power wind farms (part of an ESIA)	2019
Khoury Contracting Lebanon	Study of the implementation of odour monitoring network including online modeling for Bourj Hammoud landfill	2019

Client	Project	Date
ELARD – Dubai Municipality UAE	Online Air Emission Inventory System and Air Quality Forecasting in the Emirate of Dubai, Dubai – UAE, In charge of airports, harbors, and area emissions	2018
ELARD – UNDP Lebanon	Design of training for Municipalities on Air Quality	2018
Dany Doumit Lebanon	Air dispersion Modeling (EIA) - Kfarchima Incinerator	2018
GFA-MoE Lebanon	Support to Air Quality department at the Lebanese Ministry of Environment: Development of air quality data validation protocol based on European and American protocols and validation of air quality data.	2017-2018
MORES – Batroun Municipalities Union, Lebanon	Air dispersion Modeling (EIA) – Batroun Incinerator	2017
Eye witness at the Lebanese Court, Lebanon	Jiyeh Power plant Case	2017
Booz Allen Hamilton - Ministry of Environment, Water, and Agriculture, Kingdom of Saudi Arabia	Environmental strategy of KSA In charge of the Air quality/Meteorology/Climate Change section	2017
Council for Development and Reconstruction – Lebanon	Tripoli – Abboudiye Railway (Air quality expert: road transport emissions calculation) – Part of an EIA	2017
Council for Development and Reconstruction – Lebanon	Tabarja – Beirut Bus Rapid Transit (Air quality expert: road transport emissions calculation) – Part of an EIA	2017
UNDP-MoE, Lebanon	Lebanon's Second Biennial Update Report – Transport sector	2017
Emirates National Oil Company, Dubai, UAE	Training on "Fundamentals of air dispersion modeling"	2017
World Bank/Lebanese Ministry of Environment Lebanon	Lebanon Environmental Pollution Abatement Project (LEPAP), Improving the capacity for Environmental Compliance Air Emissions Expert: technical and financial assessment of air pollution control equipment to be financed by the World Bank	2016
EU/Lebanese Ministry of Environment Lebanon	Development of the National Air Quality Management Strategy for Lebanon Technical Expert	2016
Ministry of the Environment – Lebanon	Data validation of the national air quality network for the years 2013 to 2015	2016
ELARD - Dubai Municipality UAE	Expansion of the air quality network in Dubai (Forecast of air quality in 2020 through modeling of all emissions sources from the different sectors using CALPUFF & OZIP/EKMA, data validation of the air quality monitoring network, site selection, selection of instruments, preparation of the TOR for RFP for the installation of air quality monitoring stations)	2016

Client	Project	Date
	Team Leader	
Urban Community al Fayhaa Lebanon	- Data validation of the air quality monitoring network at Al Fayhaa Urban Community – Lebanon. - Technical support to the Air Quality Laboratory	2016 - 2017
Khatib & Alami - Electricité de Jbeil Lebanon	Air Dispersion modeling for the installation of a Power Plant in Blat area (Compliance modeling using CALPUFF) – Part of an EIA	2016
Ministry of the Environment – Lebanon	Selection of the sites for the national air quality monitoring network using measurements and air dispersion modeling (11 sites over Lebanon for the implementation of the Air Quality Monitoring Stations using USEPA reference methods)	2016

Technical Director of Centre d'Analyses et de Recherche (CAR), USJ, Lebanon, 2010-Present

Offering services, expertise and training for the industries, academic institutions, and research institutions.

- Requesting offers for products and instruments
- Developing new analytical methods
- Assessing feasibility of new services and trainings
- Managing technical team
- Implementing chemical safety procedures
- Consultancy services to industries in the sectors of agro-food, paint, oil, textile, sand, cement, etc.
- Training on Quality Control/Quality Assurance (QC/QA), equipment and techniques used for chemical analysis
- QC/QA for chemical analysis of food, paint, oil, textile, sand, cement, pharmaceutical

Director and Quality Manager of the Master program “Industrial Technology”, USJ, Lebanon, 2013-2016

- Design of curriculum including proposal and review
- Advising for students
- Schedule design
- Contact with industries
- Quality Management of the system – ISO 9001:2008

Coordinator of ECOCEM air pollution project, Lebanon, 2009 - 2013

Project Budget: ~250 000 USD.

- Designing and implementing the “Emission and Chemistry of Organic Carbon at the East Mediterranean – Beirut” project (emissions, measurements and modeling)
- Designing and Implementing of 2 field measurement campaigns for gas and particulate phases (over 70 pollutants).

Partners: Faculty of sciences-USJ, LISA – Université Paris Est – Créteil- France, Ecole des Mines de Douai-France, Ecole des Ponts ParisTech - France, National Oceanic and Atmospheric Administration – USA and Paul Scherrer Institute - Switzerland.

Coordinator of TRANSEM air pollution project, Lebanon, 2013 - Present

Project Budget: ~200 000 USD

- Designing and implementing the "Transport & Emissions" project (emissions from on-road transport for the Lebanese fleet)
- Designing and implementing a tunnel field measurement campaign for gas and particulate phases in order to determine emission factors for the Lebanese fleet.

Partners: Faculty of sciences-USJ, Lebanese American University, LISA – Université Paris Est – Créteil- France, Ecole des Ponts ParisTech – France.

Coordinator and Principal Investigator of "Assessment of the tropospheric HONO budget: instrumental development and field measurements" air pollution project, PEER Program

USAID/NSF, Lebanon, 2012 - 2014

Budget of the project: ~146 100 USD

- Designing and constructing an instrument for the measurement of HONO
- Designing and implementing the field campaign in Beirut
- Designing and implementing the field campaign in Bloomington (Indiana, USA) with the US partner (Dr. Sebastian Dusanter, University of Indiana)
- Managing the research project team (postdoctoral fellow and MS students)
- Managing personnel, financial expenditure and reporting to the NAS officer

Air pollution field measurement campaigns, 2006 – present

- African Monsoon Multidisciplinary Analyses (AMMA) in August 2006, Niamey, Niger (European field campaign). Airborne measurements of major photo-oxidants. Airborne platforms: ATR42 and Falcon20 (12 hours of flight). In charge of measuring and analyzing major aldehydes and ketones. Calibration and maintenance of measuring instruments.
- Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation (MEGAPOLI) in June 2009 – July 2009 and Jan. 2010 – Feb. 2010, Paris, France (European field campaign). In charge of ground site measurements of HONO, ozone, CO, primary VOCs (hydrocarbons from C4 to C9), major aldehydes and ketones, NOx, NOy and of the calibration and maintenance of measuring instruments.
- Formal Inter-comparisons of Observations of Nitrous Acid (FIONA) in May 2010, Valencia, Spain
Simulation chamber experiments of nitrous acid. Deployment of NitroMAC.
- CalNex field campaign in June 2010, Los Angeles, USA
Measurements of nitrous acid using of NitroMAC
- Les surfaces internes à l'habitat, une source probable d'acide nitreux (SURFIN), July 2011, Marseille, France
Indoor measurements of nitrous acid using NitroMAC
- Emission and Chemistry of Organic Carbon at the East Mediterranean – Beirut (ECOCHEM), July 2011 and February 2012, Beirut, Lebanon
Measurement of oxygenated volatile organic compounds and secondary organic aerosols
- ChArMEx: Chemistry-Aerosol Mediterranean Experiment, July 2013, Corsica – France
- Measurement of gaseous oxygenated volatile organic compounds

- Field measurement of HONO during “Assessment of the tropospheric HONO budget: instrumental development and field measurements”, August 2013, Bloomington, Indiana – USA
- TRANSEM: TRANSport & Emissions – Beirut, Measurement of emission factors for the transport sector in Lebanon, June-July 2014, Beirut – Lebanon
- TRANSEMED: Transport Emissions and Mitigation in the Middle East, Turkey, September 2014.

National Reports

1. MoE/EU (2017). Lebanon's National Strategy for Air Quality Management for 2030. Beirut, Lebanon
2. MoE/UNDP/GEF (2017). Lebanon's second biennial update report to the UNFCCC. Beirut, Lebanon.
3. MoE/UNDP/GEF (2016). Lebanon's third national communication to the UNFCCC. Beirut, Lebanon.
4. MoE/UNDP/GEF (2015). National Greenhouse Gas Inventory Report and Mitigation Analysis for the Transport Sector in Lebanon. Beirut, Lebanon.
5. Zanini, G., Afif, C., Abdallah, C., Briganti, G., Cappelletti, A., D'Isidoro, M., Piersanti, A. (2015). Report on the joint exercise ENEA-USJ on Air quality modeling over Lebanon, 30pp.
6. MoE/UNDP/GEF (2015). Lebanon's first biennial update report to the UNFCCC. Beirut, Lebanon.
7. MoE/EU/UNDP (2014). Lebanon Environmental Assessment of the Syrian Conflict & Priority Interventions, Chap. 4, 163 pp.

SCIENTIFIC PUBLICATIONS

(published in the last 3 years out of a total of 40)

1. Abdallah, C., Afif, C., El Masri, N., Ozturk, F., Keles, M., Sartelet, K. (2018). A first annual assessment of air quality modeling over Lebanon using WRF/Polyphemus. Atmospheric Pollution Research, <https://doi.org/10.1016/j.apr.2018.01.003>.
2. Haddad, M., Mansour, C., Afif, C. (2018). Future Trends and Mitigation Options for Energy Consumption and Greenhouse Gas Emissions in a Developing Country of the Middle East Region: a Case Study of Lebanon's Road Transport Sector. Environ Model Assess, 23, 263-276.
3. Rajha, H., El Kantar, S., Afif, C., Boussetta, N., Louka, N., Maroun, R., Vorobiev, E. (2018). Selective multistage extraction process of biomolecules from vine shoots by a combination of biological, chemical, and physical treatments. Comptes Rendus Chimie, 21, 581-589.
4. El Khoury, R., Mathieu, F., Atoui, A., Kawtharani, H., El Khoury, A., Afif, C., Maroun, R., El Khoury, A. (2017). Ability of soil isolated actinobacterial strains to prevent, bind and biodegrade ochratoxin A, Toxins, 9, 222
5. Dhaini, H., Salameh, T., Waked, A., Sauvage, S., Borbon, A., Formenti, P., Doussin, J.-F., Locoge, N., Afif, C. (2017). Quantitative cancer risk assessment and local mortality burden for ambient air pollution in an eastern Mediterranean City. Env. Sc. Pollut. Res., DOI 10.1007/s11356-017-9000-y.

6. Nader, J., Afif, C., Louka, N. (2017). Expansion of partially defatted peanuts by a new texturizing process called "Intensification of Vaporization by Decompression to the Vacuum" (IVDV). *Innovative Food Science & Emerging Technologies*, 41, 179-187.
7. Mendez, M., Blond, N., Amedro, D., Hauglustaine, D.A., Blondeau, P., Afif, C., Fittschen, C., Schoemaeker, C. (2017). Assessment of indoor HONO formation mechanisms based on in situ measurements and modeling. *Indoor Air*, 27, 443-451.
8. Mendez, M., Amedro, D., Blond, N., Hauglustaine, D.A., Blondeau, P., Afif, C., Fittschen, C., Schoemaeker, C. (2017). Identification of the major HOx radical pathways in an indoor air environment. *Indoor Air*, 27, 434-442.
9. Salameh, T., Borbon, A., Afif, C., Sauvage, S., Leonardi, T., Gaimoz, C., Locoge, N. (2017). Composition of gaseous organic carbon during ECOCEM in Beirut, Lebanon: new observational constraints for VOC anthropogenic emission evaluation in the Middle East. *Atmos. Chem. Phys.*, 17, 193-209
10. Abdallah, C., Sartelet, K., Afif, C. (2016). Influence of boundary conditions and anthropogenic emission inventories on simulated O₃ and PM_{2.5} concentrations over Lebanon. *Atmospheric Pollution Research*, 7, 971-979
11. Afif, C., Jambert, C., Michoud, V., Colomb, A., Eyglunet, G., Borbon, A., Daele, V., Doussin, J.F., Perros, P. (2016). NitroMAC: an instrument for the measurement of HONO and intercomparison with the Long-Path Absorption Photometer. *Journal of Environmental Sciences*, 40, 105-113.
12. Nader, J., Afif, C., Louka, N. (2016). Study of physiological and textural properties of roasted peanuts defatted by an innovative oil extraction process. Correlation with consumer evaluation. *Innovative Food Science & Emerging Technologies*, 33, 450-461.
13. Nader, J., Fawaz, N., Afif, C., Louka, N. (2016). A novel process for preparing low-fat peanuts: Optimization of the oil extraction yield with limited structural and organoleptic damage. *Food Chemistry*; 197 (Part B), 1215-1225.
14. Nader, J., Afif, C., Louka, N. (2016). Color and texture of low-calorie peanuts as affected by a new oil extraction process named "Mechanical Expression Preserving Shape Integrity" (MEPSI). *Journal of Food Science and Technology*, 53, 1649-1662.
15. Salameh, T., Sauvage, S., Afif, C., Borbon, A., Locoge, N. (2016). Source apportionment vs. emission inventories of non-methane hydrocarbons (NMHC) in an urban area of the Middle East: local and global perspectives. *Atmospheric Chemistry and Physics*; 16, 3595-3607.

Books

- Multiple authors (2008). *Incertitude et environnement*, Chap. 1, Edisud.
- Multiple authors (2016). *The Mediterranean region under the Climate Change. A scientific update*, IRD editions.

LANGUAGE SKILLS

	Reading	Speaking	Writing
English	5	5	5
French	5	5	5
Arabic	5	5	5

Proficiency is marked from 1 to 5, such that 1=basic & 5=fluent

EL-KHOURY EL-INDARY Shadi

Indary Bld., Citadelle Street
Bziza – El Koura
Lebanon

Date of Birth: December 31, 1979
Nationality: Lebanese
Marital Status: Married
Tel: +00 961 (0) 3 196 439
E-mail: shadi.elindary@balamand.edu.lb

Education

2004 - 2005: Masters degree in “Ecology and Biodiversity”
University of Aix-Marseille III – Paul Cezanne ; Marseille – France.

1998 - 2003: BS (Bachelor of Science) in Animal Biology- Zoology axis
Lebanese University, Faculty of science; Beirut – Lebanon.

1996 - 1997: Lebanese Baccalaureate, Experimental Sciences Option
“Sœur du rosaire” College; Byblos – Lebanon.

Employment

September 2007 - Till date: Instructor and Program Assistant at the Marine and Coastal Resources (MCR) - Institute of the Environment (IOE) - University of Balamand (www.balamand.edu.lb).

September 2008 – February 2009: Teaching course of “Introduction to Environmental Sciences” at AUCE University – Koura, Lebanon.

May 2006 - August 2007: Inspector in Organic agriculture with LIBANCERT s.a.r.l a Lebanese Organic Inspection and Certification Body. Beirut – Lebanon (www.libancert.org).

Selected Professional Experience

- Team member in the project entitled “Promoting marine biodiversity and improving fishery potential and marine ecotourism activities through the deployment of Artificial Reefs off the Lebanese coast”. Project Funded by the EC, 2018-2019 implemented by the MCR-IOE-UOB at Mount Lebanon.

- Coordinating the study entitled “Mammalian and Avian Biodiversity Assessment at Jered Tannourine”, held by the IOE-UOB, 2017-2018.
- Coordinating and supervising the M.sc. of Mrs Reina Trad at the Department of Environmental Sciences - UOB, study entitled “ Assessing the Richness of Medium- Sized Mammals in a Semi Urban Area: Case Study of the University of Balamand Campus in Al Kurah, North Lebanon”, 2016 - 2017.
- Coordinated as part of the MCR-IOE-UOB the project entitled Legal and technical support for developing ecotourism at the Palm Island Nature Reserve, 2015-2016.
- Coordinated as part of the MCR-IOE-UOB the project entitled “The implementation of a pilot case study on the Ecosystem Approach to Fisheries in Lebanon”. The main objective of this initiative is to develop of a draft fishery management plan and action plan for capacity development with a focus on the Purse Seine Sardine Fishery in Lebanon. Project is funded by the FAO-EastMed and implemented in collaboration with the Lebanese Ministry of Agriculture in 2015-2016.
- In charge of writing of the biodiversity chapter for the Scoping Report of the Awali River Basin and Coastal Area, in 2015.
- Mapping Responsible Public Hunting Areas (RHAs) in Lebanon. Project funded by Society for the Protection of Nature in Lebanon (SPNL), 2013-2014.
- Coordinated as part of the MCR-IOE-UOB the project entitled “Pilot survey on fisheries dependent data collection in Lebanon including training (PO 299074)”. The main objective of this initiative is to contribute to the elaboration and implementation of a national artisanal fisheries data collection program in Lebanon. Project was funded by the FAO-EastMed and implemented in collaboration with the Lebanese Ministry of Agriculture in 2013-2014.
- Contributed as part of the MCR-IOE-UOB team in the PEGASO project which aim to provide an opportunity to the science and end-user communities all around the Med Sea and Black Sea basins to work together in order to identify common threats and solutions to the long-term sustainable development and environmental protection of coastal zones bordering theses regional seas, from 2010-2014.
- Contributed as part of the MCR-IOE-UOB team in the UNEP/MOE project entitled “Environmental Resources Monitoring in Lebanon, Identification and Assessment of Coastal Sensitive Areas in Lebanon, in 2012-2013.
- Contributed as part of the MCR-IOE-UOB team in the scientific element for building an artificial reef, Aabdeh, North Lebanon, 2012 using military vehicles provided by the Lebanese army.

- Contributed as part of the MCR-IOE-UOB team in the IMAC project which aim to establish goals for coastal zone management that are supported and eventually adopted by relevant stakeholders and based on an in-depth assessment and evaluation of the status of the coastal zone and its current management strategies, implemented in North Lebanon, from 2006-2009.
- Coordinated the assessment of mammalian biodiversity at the Horsh Ehden Nature Reserve using a non-invasive method in a transect-quadrat survey scheme, in 2008-2009.
- Project proposals writing, budgeting and submitting for national and international funding in addition to drafting reports and preparations of workshops.

Specialized Trainings

- Training on the IUCN criteria adopted for the Red Listing of species. June 13-14 2019, Byblos, Lebanon.
- Training on fish stock assessment methods using Catch/Effort data organized by the EastMed project in Antalya-Turkey from 16 to 20 March 2015.
- Training and attending the advanced course on the “Ecosystem Approach to Fisheries in the Mediterranean and Blackseas. Scientific Bases”, Varna, Bulgaria from 1 to 9 February 2014.
- Training on fish stock assessment methods organized by the MedSudMed project in Malta from 12 to 16 December 2011.
- Training and field experience in using of coastal oceanography equipment (Wave Height and Acoustic Current Meter, Echo-Sounder, Geographical Positioning System).
- Training and field experience in using of benthic and bathing indicators equipment (Hand-sediment corer for chemical analyses and biological analyses, Sediment Shaker, Water quality monitoring system, kits for assessing *Escherichia coli* (E.coli) and kits for measuring Total Sulfide).
- Training on the system for inspection of organic production with Bioinspecta, the Swiss inspection and certification body (May 2006).
- Training on Organic certification procedure according to the EU regulations 2092/91 with FiBL, Research Institute of Organic Agriculture of Switzerland (October 2006).
- Training on ISO 22 000 basics, advanced and implementation with QUALEB program (January – February 2006).

- Training on ISO 65 basics, advanced and implementation with FiBL, Research Institute of Organic Agriculture of Switzerland (February 2006).

Scientific Publications

- Nader M., Mitri G., El Indary S., Nasrallah G. and Haidar E., 2019. Determining Faunal (Mammalian and Avian) and Floral Species Richness at Jered Tannourine, North Lebanon, Lebanon (May 2019); Institute of the Environment, University of Balamand.
- Nader, M.; El Indary, S.; and Abou Dagher, M., Vasconcelos, M., Majdalani, S., Lahoud, I. 2019. Implementation of the ecosystem approach to fisheries for the purse seine fisheries in Lebanon: baseline report. FAO Fisheries and Aquaculture Technical Paper (In Press).
- MOE/GEF (2016). Updating the 2002 SAP-BIO National Report for the Country of Lebanon. Prepared by Nader M., and Talhouk S. May 2016.
- Boustany L., El Indary S., Nader M. (2015). Biological characteristics of the Lesspsian pufferfish *Lagocephalus sceleratus* (Gmelin, 1789) off Lebanon. Cahier de Biologie Marine, 56:137-142.
- Manal R. Nader, Shadi El Indary, and Manale Abou Dagher (2015). Chapter 4: North Lebanon – Bio-Physical, Social, Economic and Political Features of the Study Area. In Irna van der Molen and Nora Stel (Eds.), Conflict and Environment in North Lebanon Vulnerability and Resilience from a Multi-Disciplinary Perspective (pp. 55 – 106). Enschede, The Netherlands: Ispkamp Drukkers.
- Nader, M.; Abou Dagher, M.; Zaarour, N.; El Indary S. 2015. Guidelines And Best Practices For Coastal Sustainable Management - Protocol On The Integrated Coastal Management In The Mediterranean Zone - A Handbook Of Progress. GREAT Med project, 50p.p.
- Nader MR, El Indary S and Moniri NR (2014) Historical fisheries catch reconstruction for Lebanon (GSA 27), 1950-2010. Fisheries Centre Working Paper #2014-11, Fisheries Centre, University of British Columbia, Vancouver (Canada). 19 p.
- Nader M., El Indary S. & Abou Dagher M. 2013. Ecotourism Potential in the Artisanal Fisheries Sector Along the Lebanese Coast. UNDP report 2013.
- El Indary S. & Orr M. 2013. Birdtalk Lebanon: A Platform for Birding Enthusiasts in Lebanon. Bulletin of the Mediterranean Waterbirds Network. No. 1, News.

- Nader M., El Indary S. & Stamatopoulos C. 2012. Assessment of Commercial Fish Species in North Lebanon 2006-2011. Land-Sea Interactions in the Coastal Zone. Jounieh-Lebanon, November 8-10, 2012.
- Abou-Dagher M., Nader M. & El Indary S. 2012. Evolution of the coast of North Lebanon from 1962-2007: mapping changes for the identification of hotspots and for future management interventions. Fourth International Symposium, Monitoring of Mediterranean Coastal Areas: Problems and Measurements Techniques, Livorno – Italy. June 12-14.
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- El Indary S. 2010. First confirmed breeding record of Little Ringed Plover *Charadrius dubius* for Lebanon, 2009. Sandgrouse, Volume 32 (2) :134-135.
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- Azar D., Hajar L. & El Indary C. 2008. A new Mesozoic fossil family of Psocoptera (*Insecta: Psocoptera: Psocomorpha*). Annales de la Societe Entomologique de France. 44(4):459-470.

Languages

Arabic	Mother tongue
English	Fluent, reading writing and speaking
French	Fluent, reading writing and speaking

Computational and Data Processing Skills

- A long and full experienced in using Excel, PowerPoint, Access, Word, and statistical software (STATVIEW, STATISTICA).

Activities and interests

- Bird watching
- Insects collections
- Hiking

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EXPERIENCE

WORK EXPERIENCE

October 2007 onwards

**University of Balamand
Institute of the Environment**

- Program Assistant at the Marine and Coastal Resources Program
- In charge of several researches and studies such as “the evolution study of the coast of North Lebanon” and other physical geography and Land use/land cover changes analysis
- Contributing as part of the team in several national and international projects such as:
 - **Promoting marine biodiversity and improving fishery potential and marine ecotourism activities through the deployment of Artificial Reefs off the Lebanese coast.** Project Funded by the EC, 2018-2019.
 - **The implementation of a pilot case study on the Ecosystem Approach to Fisheries (EAF) in Lebanon.** Project funded by Food and Agriculture Organization of the United Nations (FAO), 2016.
 - **Scoping report of the Awali basin and coastal area and TORs for their integrated management plan.** Project funded by UNEP GEF Medpartnership, 2015.
 - **Sustainable Action for Bioenergy Production in Koura (SABioP).** Project Funded by the EC, 2015-2018.
 - **Legal and technical support for developing ecotourism at the Palm Island Nature Reserve.** Project funded by the Palm Island Nature Reserve, 2014-2016.
 - **National Consultancy for the Identification of Legal, Policy and Institutional Gaps and Policy Reforms Drafted for Marine and Coastal Biodiversity Protection.** Project funded by the GEF, implemented by UNEP and executed by the Ministry of Environment, 2014-2015.
 - **Forestry actions in Lebanon/ Assessing Reforestation and Forest Development Activities in partnership with local communities (ARDAC).** Project Funded by the EC, 2014-2018.
 - **Mapping Potential Public Hunting Areas (PHAs) in Lebanon.** Project funded by Society for the Protection of Nature in Lebanon (SPNL), 2013-2014.
 - **Environmental Resources Monitoring in Lebanon, Identification and Assessment of Coastal Sensitive Areas in Lebanon.** Project funded by the UNEP/MOE, 2012-2013.
 - **Deployment of an artificial reef in Abdeh marine waters, North Lebanon.** Project funded by Lions/Rotary-Lebanon. 2012.

- **People for Ecosystem Based Governance in Assessing Sustainable Development of Ocean and Coast (PEGASO).** Project funded by the EC, 2010-2014.
- **Survey of the fishing sector and associated activities in Abdeh Harbour-North Lebanon.** Project promoted and implemented by the UNDP, 2009.
- **Conflict and Environment in North-Lebanon: A longitudinal study of environmental and socio-economic mitigation processes in conflict-affected areas.** Project funded by the Netherland Organization for Scientific Research-WOTRO Science for Global Development, 2009-2014.
- **Assessing the Mammalian Diversity in Horsh Ehden Nature Reserve.** Project funded by Royal Embassy of the Netherlands in Lebanon, 2008-2010.
- **Integrated Management of East Mediterranean Coastlines (IMAC).** Project Funded by the EC, 2006-2009.
- Being in charge of mapping, GIS analysis and Land use/land cover changes analysis
- Using coastal oceanography equipment (Wave Height and Acoustic Current Meter, Echo-Sounder, Geographical Positioning System)
- Using benthic and bathing indicators equipment (Hand-sediment corer, Sediment Shaker, Water quality monitoring system)
- Using Decision Support System tools such as Fuzzy Cognitive Mapping and Bayesian Belief Networks.
- Drafting reports and scientific publications
- Writing proposals including budgeting for submission to national and international funding agencies and donors
- Writing TORs and technical specifications
- Implementing and using public participation tools such as preparing roundtables and workshops
- Assisting students in their thesis and residencies projects
- Teaching sessions for environmental sciences and health sciences students

June 2005 - September 2007

Bibliothèque Orientale

- Documented maps and geographic documents
- In charge of the cartotheque

November 2004 - February 2005

**Institut Français du Proche-Orient
Atlas of Syria**

- Entered demographical data about Syrian regions.

January - April 2004 (cartographer)

**Saint Joseph University
Cartographic Laboratory**

- Manually mapped administrative districts for the region of Naher-Beirut
- Digitized maps

July - August 2003 (training period)

**Ministry of Environment and UNDP
MedWet Coast Project**

- Administrative tasks

October 2002 (training period)

**Saint Joseph University
Cartographic Laboratory**

- Drew and digitized maps using Arc Info software

July 2002 (training period)

**A.A.A Atelier des Architectes Associés
SDATL Project**

- Researched and compiled information on touristic/cultural sites and old residences
- Localized sites on maps

PUBLICATIONS

- **Nader, M.; Indary, S.; and Abou Dagher, M., Vasconcelos, M., Majdalani, S., Lahoud, I.** (2019). Implementation of the ecosystem approach to fisheries for the purse seine fisheries in Lebanon: baseline report. FAO Fisheries and Aquaculture Technical Paper (In Press).
- **Nader M. and Abou Dagher M.** (2016). Development of an integrated coastal zone management law in Lebanon. Book of abstracts, The 3rd International Conference on Coastal Zone Engineering and Management in the Middle East (Arabian Coast 2016), 20 to 23 November 2016 (pp. 26-27) Dubai, UAE.
- **Abbas N., Abou Dagher M., Nader M., Van Der Molen I. and Lovett J.** (2016). Analyzing linkages between trust and solid waste management using the fuzzy cognitive mapping approach: Case study of Al-Fayhaa Union, Lebanon. In the Solutions for a Better Life: World Future Leaders Conference, 21-25 February 2016, University of Sharjah, UAE.
- **Nader M., Indary S. and Abou Dagher M.** (2015). Chapter 4: North Lebanon – Bio-Physical, Social, Economic and Political Features of the Study Area. In Irna van der Molen and Nora Stel (Eds.), *Conflict and Environment in North Lebanon Vulnerability and Resilience from a Multi-Disciplinary Perspective* (pp. 55 – 106). Enschede, The Netherlands: Ispkamp Drukkers.
- **Abou Dagher M., Nader M. and El Indary S.** (2013). Evolution of the coast of North Lebanon from 1962 – 2007: mapping changes for the identifications of hotspots and for future management interventions. Fourth Symposium "Monitoring of Mediterranean coastal areas: problems and measurement techniques" - Livorno (Italy) 12-13-14 June 2012 Proceedings
- **Nader M., El Indary S. and Abou Dagher M.** (2013). Ecotourism Potential in the Artisanal Fisheries Sector Along the Lebanese Coast. UNDP report 2013.

- **Nader M, Indary S, Salloum B, Dagher MA** (2011). Combining non-invasive methods for the rapid assessment of mammalian richness in a transect-quadrat survey scheme – Case Study of the Horsh Ehden Nature Reserve, North Lebanon. ZooKeys 119: 63–71. doi: 10.3897/zookeys.119.1040.
- **Meliadou A., Santoro F., Nader M., Abou Dagher M., Al Indary S. and Abi Salloum B.** (2012) Prioritising coastal zone management issues through fuzzy cognitive mapping approach. Journal of Environmental Management 97 (2012) 56-68.

TRAININGS & WORKSHOPS

Attended meetings, conferences and seminars locally and internationally on a regular basis.

1-2 April 2019

ESRI Lebanon-Beirut

- Sharing GIS Content Using ArcGIS

28 March

ESRI Lebanon-Beirut

- Configuring Web Apps Using Web App Builder for ArcGIS

27 June-15 July 2011

**University of Twente-Geo-information
Sciences and Earth Observation, Twente, The Netherlands**

- Certification: Short course in spatial change and spatial interaction modeling

28 June-3 July 2006

Pôle Universitaire Normand-Le Havre-France

- Participated in the Ecole d'été: « Initiatives pour un aménagement durable des territoires en Normandie »
-

EDUCATION

2007 **Saint Joseph University, Faculty of Human Sciences, Beirut, Lebanon**

Masters in Geography: Environment and land management

Thesis: Evolution of the coast of Jbayl South, toward an Integrated Management of the Coastal Zone

2004 **Saint Joseph University, Faculty of Human Sciences, Beirut, Lebanon**

B.A in Geography : Environment and land management

Graduation project: Geomorphologic map, for the region of Mrouj, Metn, Lebanon.

2001 **Collège Val Père Jacques, Bkennaya, Lebanon**

Lebanese Baccalaureate: Life Science

ACTIVITIES

2005-2006

Caving activities with the « Association Libanaise d'Etudes Spéléologiques » (ALES)

- Participated in The Second Speleology Symposium (MESS II)
- Presented: "Speleo-Archaeology as a base for eco-tourism development : Wadi Nahr Al-Aasfour (North Lebanon)"

COMPUTER LANGUAGES & SKILLS

- | | |
|--------------------------------------|---|
| ▪ Microsoft : | Windows, Word, Excel, Power Point, Access |
| ▪ GIS and Remote Sensing softwares : | Arc Info, Map Info, ERDAS |
| ▪ DSS softwares: | FCMapper |

LANGUAGES

- Fluent in Arabic, English and French (Read, Written and Spoken)
 - Fair in Spanish (Read, Written and Spoken)
- English Proficiency Test: **Advanced Proficiency** from the Georgetown University.



THIS PROJECT IS FUNDED
BY THE EUROPEAN UNION

**Technical Assistance to Support the
Government of Lebanon's Preparation of
Exploiting and Producing Offshore Oil and
Gas Resources**



A PROJECT IMPLEMENTED BY A
GFA CONSULTING GROUP LED CONSORTIUM

**APPENDIX D: GUIDANCE ON ESTABLISHING ENVIRONMENTAL BASELINE PRIOR TO OFFSHORE
RECONNAISSANCE AND EXPLORATION DRILLING ACTIVITIES (BASED ON EIA GUIDELINE)**



GUIDANCE ON ESTABLISHING ENVIRONMENTAL BASELINE PRIOR TO OFFSHORE RECONNAISSANCE AND EXPLORATION DRILLING ACTIVITIES

GENERAL

Environmental monitoring should be undertaken throughout the different phases of offshore oil and gas activities.

The purpose of the monitoring is to assess the nature and spatial extent of materials discharged during the various phases of offshore oil and gas activities and to understand how the marine environment responds to being exposed to the activities and pollution. The monitoring results allows for appropriate measures to be taken in case of unpredicted development for planned and future activities.

The scope and frequency of the environmental monitoring programs should relate to the expected risk, and hence the program will be less comprehensive for a single exploration drilling than for a field development and production.

In any case, it is necessary to establish a baseline prior to the activities in order to be able to determine the impact and area extent of impact from contaminants discharged, and it is essential that the baseline studies are planned and carried out in a way that allows for comparable follow up studies if necessary. Baseline or initial surveys will provide data on the existing environment and will assist with the design of future monitoring programs.

Any operator planning for reconnaissance activities or exploration drilling in the Lebanese territorial water, will need to initiate a dialogue with the environmental authorities in due time when planning a baseline survey. The environmental authorities may provide instructions, guidance or references with regards to e.g. sampling methods, quality assurance, reporting and storage of data.

BASELINE FOR SEISMIC SURVEY

A seismic survey has a large area of influence. The area potentially influenced by underwater noise from seismic shooting should be identified by acoustic modelling. Available data on fish stock in the area, fisheries, occurrence of marine mammals should be compiled and will constitute the baseline. During the seismic operations, the marine mammal observers (MMOs) should record sightings in line with JNCC and acoustic monitoring should be considered.

BASELINE FOR EXPLORATION DRILLING

Exploration drillings are temporary activities with a mobile rig. Drilling of one well may take 40-120 days, depending of the depth of the reservoir and the drilling strategy.

Physical damage of structures at the seabed from the planned operation is possible due to both anchoring, the spud, the cement work at the seabed and the discharges of drilling chemicals and drill cuttings, if any. However, currents and other physical parameters may result in a wider

distribution of contamination. Exploration drilling entails a risk for unplanned accidents like a blow-out which will have a long-reach impact. Compilation of primary data for baseline studies will normally not extend to the potential influence area of a blow-out scenario.

The purpose of baseline surveys is to establish background data for the various parameters, as well as a 'robust' average value that will represent the basis for a local LSC (Limit of Significant Contamination).

Preliminary guidelines for baseline survey prior to exploration drilling are given below. These guidelines are based on international experience, in particular OSPAR Guidelines for Monitoring the Environmental Impact of Offshore Oil and Gas Activities, Agreement 17:02 and the Norwegian Guidelines

[\(http://www.miljodirektoratet.no/no/Publikasjoner/2015/September-2015/Environmental-monitoring-of-petroleum-activities-on-the-Norwegian-continental-shelf/\).](http://www.miljodirektoratet.no/no/Publikasjoner/2015/September-2015/Environmental-monitoring-of-petroleum-activities-on-the-Norwegian-continental-shelf/)

The baseline survey prior to exploration drilling should (as a minimum) comprise monitoring of benthic habitats (sediments, soft- and hard bottom-fauna), water column monitoring and visual surveys. Due consideration should be paid to selecting parameters that are necessary to support potential following- up studies for comparison with the baseline monitoring.

Soft bottom areas

In soft -bottom areas, the surveys are based on grab sampling of the seabed. An approved grab sampler should be used for the sampling. Sediment composition, chemical parameters and soft-bottom fauna are to be investigated. The chemical analyses should include heavy metals and oil compounds¹, and the composition and condition of the soft-bottom fauna should be described.

In areas with hard substrate, where conventional sampling equipment cannot be used, or in areas defined as vulnerable or where the presence of vulnerable species or habitats (coral reefs) is probable, visual surveys may be required in addition to traditional monitoring, e.g. by use of VAMS (Video Assisted Multi Sampler).

It is recommended to establish stations along radial transects if the drilling location is known, or a grid design if the drilling location is not known. The number of stations may depend on depth and seabed conditions.

Benthic sampling

Benthic samples should be taken with suitable equipment to avoid sediment compression. The same type of equipment should be used in subsequent surveys.

In some cases, a grab sampler may not be suitable, e.g:

- in areas where there are coral reefs or dense sponge communities;
- in areas where the seabed habitat is heterogeneous – a mixture of rock, stones and gravel with some soft-bottom areas.

¹ Exploration drilling usually entails discharge of cuttings with residue of water based drilling mud. In order to determine the area contaminated by these discharges, the chemical analysis of the baseline study usually includes: Grain size, Total Organic Carbon (TOC) and Total Hydrocarbons (THC) and Ba, Cd, Hg, Cr, Cu, Pb, Zn, Al, Li. Analysis of the oil components PAHs, NPDs and Decalins (see OSPAR Agreement 17:02) could be added for stations where THC levels are significantly higher than background.

At deeper depths (> 500 m), heavy equipment (box corer or VAMS) may be required for the sampling.

Areas with hard substrate

In areas with hard substrate, where conventional sampling equipment cannot be used, or in areas where there is reason to believe vulnerable species and habitats may occur, customized surveys shall be performed as a replacement or supplement to grab sampling surveys.

Examples of such habitats may be:

- Sponge communities (Deep Water Sponge Aggregations, OSPAR 2010a)
- Sea-pen and burrowing megafauna communities (OSPAR 2010b)
- Corals
- Established spawning areas

Visual surveys using remotely operated or towed observation gear may be used for this purpose.

Water column sampling

The program on monitoring water column for exploration drilling should include Currents, Quality parameters (pH, salinity, dissolved oxygen concentrations, temperature, turbidity and redox potential) and additional chemical parameters including the concentration of total suspended solids (TSS), total organic carbons (TOC), nitrates, total nitrogen (TN), total phosphorus (TP), hydrocarbons: aliphatic, mono-aromatic, poly-aromatic, heavy metals and chlorophyll as well as biological parameters including phytoplankton, zooplankton, total heterotrophic microorganisms, and hydrocarbon adapted microorganisms

The program on monitoring water column should also include parameters that are needed for modelling dispersion and impact of potential discharges, if any, of drill cuttings and for input data in modelling the dispersion and fate of accidental oil spill, and data necessary to support potential following up studies for comparison. It can be assumed that these data in any case will be compiled by the proponent when selecting drilling site.

It is recommended to conduct water column sampling at a minimum of three (3) depths: a) 1-2 m below sea surface; b) Mid depth, and c) 1-2 m above sea bottom. The number of stations may depend on depth and sea conditions.

Additional surveys

It may be appropriate to require additional monitoring surveys in certain areas, for example in nearshore waters or in areas where vulnerable species and habitats have been identified or there is reason to believe they may occur. The proponent is responsible for identifying the need for additional surveys.

Regarding marine cultural heritage (marine archeology), chance find surveys as well as focused visual surveys using remotely operated or towed observation gear may be applicable. Findings from sediment samples should also be considered as appropriate.

Any social baseline survey should be tailored to the project context and the baseline parameters necessary to support potential following-up studies for comparison with the baseline monitoring,

e.g. changes in livelihoods derived from fisheries. Such survey should follow international good practice and be detailed as part of the scoping report.

Regional stations

It is recommended to establish at least one regional station (representative of the region/area, but not to be influenced by oil and gas activities) which shall be used from year to year both in the baseline survey and for later monitoring surveys of the (expected) field. Results from the regional stations are to be used as reference values for assessing possible effects observed at nearby field-specific stations.

QUALITY ASSURANCE AND CONTROL

It is necessary that the contractor carrying out the baseline study has implemented a standard QA-system, e.g. ISO 9001/9002 or OSPAR JAMP (2002-15). Quality assurance should be anchored with both consultant and oil company.

The QA-system should include a verification of sampling, a plan for using reference samples, reviewing analytical methods and results and performing the quality control of the report. A standard QA-system should be used, for example ISO 9001/9002 or OSPAR JAMP (2002-15).

Quality assurance of the various analyses, both in terms of type and frequency, should be presented as part of the method description in the report. There is a minimum requirement that analyses are verified against reference samples run in the same test series as the real samples.

The QA-system should also be presented in the report. The results from the reference samples would be a natural part of result interpretation.

All suppliers of services for monitoring programs (analyses, fieldwork) must have ISO/IEC 17025:2005 accreditation or an equivalent for the methods they use. Internationally accredited laboratories should be used for sample analysis.

FURTHER GUIDANCE

The Guidance described above is mainly based on OSPAR Guidelines for Monitoring the Environmental Impact of Offshore Oil and Gas Activities, the Sections 5.2.1-5.2.4 and Table 2, as these guidelines provide specific details related to the oil and gas industry.

Further sector-specific guidance is provided in the IOGP Report no. 457 Offshore environmental monitoring for the oil and gas industry.

In the framework of the Barcelona Convention, an Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and related Assessment Criteria (IMAP) has been developed. See below link for IMAP:

http://web.unep.org/unepmap/publications/?search_api_views_fulltext=&&field_year=&sort_bef_combine=field_year%20DESC&sort_order=DESC&sort_by=field_year&page=1

Lebanese national guidelines may be developed at a later stage by the Ministry of Environment and Lebanese Petroleum Administration on monitoring of the marine environment taking into account how a future field specific monitoring program for oil and gas activities can be designed to align with the above-mentioned program.