LSE Middle East Centre

BIRZEIT UNIVERSITY

# TRANSBOUNDARY CLIMATE SECURITY

## CLIMATE VULNERABILITY AND RURAL LIVELIHOODS IN THE JORDAN RIVER BASIN

London School of Economics and Political Science
Birzeit University

Lead Authors
Michael Mason and Ziad Mimi

Final Project Report

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**Cover Image:** Spring Water Extraction and Olive Grove in Upper Hasbani, Lebanon. Michael Mason, June 2014.

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**November 2014**

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# Acknowledgements

Funded generously by the Emirates Foundation for Philanthropy through the LSE Middle East Centre, the 'Transboundary Climate Security' research project was undertaken by a partnership between LSE and Birzeit University, Palestine. It began in June 2012 and formally ended in June 2014.

The project co-directors were Dr Michael Mason (Department of Geography and Environment, LSE) and Dr Ziad Mimi (Civil Engineering Department, Birzeit University). There was a project consultant, Dr Mark Zeitoun (School of International Development, University of East Anglia) and five project researchers:

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- Ms Muna Dajani (project researcher for the Golan Heights)
- Dr Mohammed Khawlie (lead project researcher for southern Lebanon)
- Ms Sireen Abu-Jamous (project researcher for the West Bank)
- Mr Hussam Hussein (general project researcher)

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The content of this project report is the responsibility of the project team and named authors. None of the views expressed in the report are necessarily those of, or endorsed by, the funders (Emirates Foundation for Philanthropy) or the host institutions (LSE and Birzeit University).

# Executive Summary

Funded by the Emirates Foundation for Philanthropy through the LSE Middle East Centre, the 'Transboundary Climate Security' research project was undertaken by a partnership between LSE and Birzeit University, Palestine. It began in June 2012 and formally ended in June 2014.

This study investigates the climate-related vulnerabilities of agricultural communities in (post)occupation environments. Following the Intergovernmental Panel on Climate Change (2012: 5), *vulnerability* is understood as the propensity or predisposition to be adversely affected by hazards or stresses, where climatic stresses are mediated by social vulnerabilities. Military occupation by foreign armed forces comprises an exceptional but under-researched condition of social vulnerability to climate-related stresses. We define *(post)occupation* as areas with current or historically recent experience of military occupation. The three study areas reflect distinct stages of occupational control within the same regional watershed (Jordan Basin). They encompass: protracted military occupation (West Bank), annexation (Golan Heights) and post-occupation (southern Lebanon). That the coercive control regime for all three areas is, or was, administered by the Israeli state (military or civil administration) creates a governance linkage for comparative analysis. *This research project is the first comparative study of climate vulnerability in conditions of (post)occupation.*

While each of the three areas has distinctive characteristics, this Executive Summary highlights key project findings on climate vulnerability and rural livelihood choices under (post)occupation. These are related to the three research aims of the project.

### 1. To identify the main determinants of climate vulnerability for selected rural communities under (post)occupation

Across the three study areas, farmers' perceptions within the past 10-20 years of reduced water availability, increased annual mean temperatures and a delayed rainy season corroborate scientific identification of a regional drying trend. This trend is broadly consistent with scientific projections of climate change for the Jordan Basin, which focus on a northwards shift of the Mediterranean storm track, reducing annual precipitation. Climate-driven water stresses are greatest in the Jordan Rift Valley (West Bank), where most agriculture is rainfed-dependent. The climatic viability of rainfed agriculture in the Jordan Rift Valley is threatened, during the course of this century, by the projected northwards retreat of the 200mm isohyet (an indicative 'limit' for rainfed agriculture).

However, climate stresses are perceived by farmers to be less important than (post)occupational conditions in determining water availability. Israeli state practices are seen as harmful to farming livelihoods, e.g. prohibition and demolition of water infrastructure, land confiscation and/or restrictions, exclusive incentives to Israeli settlers, barriers to markets. Significantly, this holds even for contexts where Israeli military authority no longer has formal effective control – the move to Israeli civilian administration in 1981 in the Golan Heights and the withdrawal of Israeli forces from southern Lebanon in 2000. In both cases significant water supply constraints are attributed to Israeli control or influence, whether as a result of legal rules (Golan Heights) of the threatened use of force across a border (southern Lebanon). This suggests a continuum of (post)occupational practices that escapes the legally self-contained idea of occupation – effective control of a foreign territory by a hostile armed force (Hague Regulations 1907, Article 42) – contained in international humanitarian law.

### 2. To survey mechanisms for coping with differential water availability

Over the past two to three decades across the study areas, common coping practices by farmers to differential water availability are: more rainwater harvesting, selection of drought-resistant crop types (e.g. from citrus plants to dates), reductions in livestock or cultivated land, and switching from flood to drip irrigation.

Rainwater harvesting is a popular, low-cost coping practice in the three study areas, but its increased use is prohibited by the Israeli government both in the occupied Golan Heights and the Jordan Rift Valley (in Area C). There is more scope for changing crop selection. In the Jordan Rift Valley there has been a major reduction in the Palestinian production of thirsty crops (e.g. bananas, watermelons and citrus crops) and the loss of a summer season for crops now cultivated only in the winter season (e.g. eggplants, cauliflowers and green peas). Similar crop changes and reduced production were also reported in the Golan Heights and, to a lesser extent, southern Lebanon (where physical water stresses are less pronounced). Both areas favour fruit production, though with greater monocultural cultivation in the Golan Heights.

The move to drip irrigation in the occupied Golan Heights began after Israel took over in 1967, suggesting technology transfer as a consequence of occupation. Over 80% of farming households surveyed reported a switch from flood to drip irrigation over the past 5-35 years. Drip irrigation was judged to be one of the most effective coping mechanisms by West Bank farmers in the Jordan Rift Valley, though reduced water quantity and quality mean that sometimes even drip irrigation cannot meet agricultural needs, and the cultivated area is therefore reduced. Changing irrigation type was less important to farming households in southern Lebanon (just over 10% cited this as a coping action), though post-occupation damage to agricultural assets is a seen as significantly reducing the propensity to switch irrigation type.

Temporary or permanent migration is an important coping practice in the Jordan Rift Valley and southern Lebanon, but difficult to quantify. In the Jordan Rift Valley, for example, farmers from Al Jiftlik and Al Auja have moved to less water-stressed Palestinian areas to continue agriculture and also become wage labourers in Israeli settlements. By turning Palestinian farmers into wage labour, the economic feasibility and legitimacy of occupation is deepened. According to the southern Lebanese focus group, forced migration of farming households is a significant coping practice, but there are no precise statistics on these population movements: existing estimates in rural areas are rendered more uncertain by the recent, substantial inflow of refugees from Syria.

### 3. To assess the adaptive implications of farming livelihood strategies and rural livelihood choices under conditions of '(post)occupation'

The questionnaire survey and focus groups undertaken by the project distinguished between short-term coping and long-term adaptation measures in the context of differential water availability under conditions of (post)occupation. Are current farming livelihood strategies and practices equipped to address additional climate stresses in the future?

Across the three study areas, *existing independent farmers' associations* are judged the most effective means for improving the capacity of farmers to adapt to continuing water-related stresses (e.g. the *sharaka* partnership system in the West Bank and the collective-owned coolers for storing apples in the Golan Heights). This finding is not surprising in the context of a lack of support from governmental organisations, which are typically seen either as weak (Lebanese government and Palestinian Authority) or hostile (State of Israel). Collective action over shared agricultural claims is thus an act of self-determination within a domain of contested sovereign authority.

As recommended by the regional focus groups, proposed adaptation measures across the three study areas vary according to distinctive governance conditions. Each of the focus groups highlighted better governmental support for farmers, encompassing technical, economic and land supply concerns. *Existing coping practices are generally seen as templates for adaptation to future climate-related stresses subject to governmental support for their scaling up.* Yet in each area Israeli security and military practices are perceived to be the main obstacle to institutional strengthening of the farming sector: the maintenance and development of farming livelihoods is severely hampered by exceptional governance practices which systematically discriminate against the affected Arab/Druze communities. Even if the threat of use of force is rarely exercised, the securitisation of land and water resources in the three areas undermines agricultural development. This is most obvious in the occupied Golan Heights and Jordan Rift Valley, where intensifying and creeping annexation in underway; but the pervasive risk of violence faced by Lebanese farmers in the south-eastern borderlands of the Hasbani Basin is as debilitating for agricultural livelihoods.

Under conditions of (post)occupation, farming livelihoods in the three study areas are self-represented as oppositional to Israeli authority and influence, suggesting *shared social identity as a source of livelihood resilience.* Farming acquires political subjectivity as 'staying on the land', whether celebrating the small farmer *(falah)* in the occupied Golan Heights or 'striving forward' *(jihad)* in the Jordan Rift Valley. Both in the West Bank and Golan case studies, a common referent in the field survey and focus groups was the concept of *sumud* ('steadfastness') developed first in a Palestinian political context as a non-violent response to Israeli military-occupational practices. Moral attachment to the land therefore underpins livelihood choices that may be judged by third parties as economically 'irrational' but, from a participant perspective, are necessary for political resistance to a sovereign actor perceived as hostile.

## Policy implications

- There is insufficient collection and dissemination of water resource use data to allow confident assessments of the factors driving changes in water availability and quality across the Jordan Basin. Given the political sensitivity of much national data on water use, *basin-wide scientific coordination on the collection and analysis of regional meteorological and hydrological information can facilitate technical improvements in assessing shared (climatic and non-climatic) impacts on water resources.*
- Across the three study areas in the Jordan Basin, this research project highlighted the multiple means by which farmers cope with differential water availability. Some of these coping strategies already reflect adaptive responses to enduring reductions in water availability, indicating resilience in the face of climate-related water stresses. However, *policy responses must acknowledge that the physical scarcity and/or poor quality of agricultural water in the study areas is, according to those surveyed, principally caused by conditions of (post)occupation.*
- Farmer associations are the most promising institutional means for fostering effective collective action in response to water scarcity. *Internal and external support for institutional strengthening in water management is best targeted at supporting the independent farmers' associations which, in each of the study areas, have developed autonomous, bottom-up capacity for adapting to differential water availability.*
- An examination of the water rights and needs of affected communities should be the baseline for donor interventions seeking to address climate and water insecurity under (post)occupation in the Jordan River Basin. *International actors concerned with reducing the 'climate vulnerability' of small-scale farming communities in the (post)occupied regions of the Jordan Basin must respect the rule of international law – international humanitarian law, international water law, and international human rights law.*

# الملخص التنفيذي

بتمويل سخي من مؤسسة الإمارات الخيرية ومن خلال مركز الشرق الأوسط التابع لجامعة لندن للعلوم الإقتصادية والسياسية، تم تنفيذ هذا المشروع البحثي بعنوان 'الأمن المناخي المتعدي الحدود' بالشراكة ما بين جامعة لندن وجامعة بيرزيت في فلسطين حيث انطلق في تموز ٢٠١٢ واختتم رسمياً في تموز ٢٠١٤.

وتبحث هذه الدراسة في أوجه الحساسية المناخية للمجتمعات الزراعية ضمن ظروف الاحتلال وما بعده. وبحسب الهيئة الحكومية الدولية المعنية بتغيّر المناخ (٢٠١٢:٥)، يشير مفهوم الحساسية إلى الميل أو الاستعداد للتأثر سلباً بالمخاطر أو حالات الإجهاد حيث تساعد مواطن الضعف الاجتماعي على ظهور حالات الإجهاد المتعلقة بالمناخ. ويشكل الاحتلال العسكري من قبل قوى خارجية مسلحة استثناءاً عن القاعدة ولكن بشرط دراسة آثار مواطن الضعف الاجتماعي على حالات الإجهاد المرتبطة بالمناخ. ونقصد بمصطلح 'ما بعد الاحتلال' المناطق التي إما تتعرض حالياً لتجربة إحتلالية أو تخلصت منها حديثاً. وتعكس مجالات الدراسة الثلاثة المراحل البارزة للسيطرة الإحتلالية ضمن نفس الحوض المائي الإقليمي (حوض الأردن) حيث تشمل: الاحتلال العسكري طويل الأمد (الضفة الغربية) والضم (مرتفعات الجولان) و'ما بعد الاحتلال' (الجنوب اللبناني). وكون أن الدولة الاسرائيلية (من خلال إدارتها العسكرية أو المدنية) هي التي تفرض -أو قامت بفرض- نظام السيطرة القسري على المناطق الثلاث المذكورة، فذلك يشكل رابطاً إدارياً حاكماً للقيام بتحليل مقارن. ويعد هذا المشروع البحثي الأول من نوعه كدراسة مقارنة للحساسية المناخية في سياق ظروف الاحتلال وما بعده.

في حين تتصف مجالات الدراسة الثلاثة بخصائص مميزة، يركز هذا الملخص التنفيذي على أبرز نتائج المشروع بما يتعلق بالحساسية المناخية وخيارات سبل العيش الريفية في ظل ظروف الاحتلال وما بعده. وترتبط هذه النتائج بالأهداف البحثية الثلاثة للمشروع.

## ١. تعيين أبرز محددات الحساسية المناخية للمجتمعات الريفية المختارة التي تعيش في ظل ظروف الاحتلال وما بعده

على نطاق مجالات الدراسة الثلاثة، تناغمت عوامل مثل إدراك المزارعين بشح المياه المتوفرة على مدار 01-02 سنة الماضية وارتفاع متوسط الحرارة السنوي وتأخر موسم المطر مع التعريف العلمي لظاهرة الجفاف الإقليمي، بحيث أصبحت متسقة بشكل واسع مع التوقعات العلمية للتغير المناخي في منطقة حوض الأردن والتي تركز على إزاحة مسار العواصف الشرق أوسطية باتجاه الشمال الأمر الذي يقلل من المطر السنوي. ويعد الإجهاد المائي الناجم عن التغيرات المناخية الأعظم في غور الأردن( الضفة الغربية) حيث اعتماد معظم الزراعة على مياه الأمطار. وخلال هذا العقد من الزمن، هدد التغير المناخي للزراعة البعلية في غور الأردن نتيجة الانحسار المتوقع لخط تساوي المطر(٢٠٠ملم: الحد اللازم للزراعة البعلية) نحو الاتجاه الشمالي.

وعلى الرغم من ذلك، يقلل المزارعون من أهمية التغيرالمناخي وأثره على تحديد مدى توفر المياه مقارنة بظروف الاحتلال وما بعده، حيث تعد سياسات الدولة الإسرائيلية مضرة بسبل عيش المزارعين، متمثلة بمنع إنشاء أو هدم البنية التحتية المائية ومصادرة الأراضي و/أو القيود والحوافز الحصرية للمستوطنين الإسرائيليين وعوائق الوصول للسوق). والملفت للنظرهنا بأن هذه السياسات ما زالت تطبق في سياق مناطق لم يعد للسلطات العسكرية الإسرائيلية أية سيطرة فعلية رسمية- الإنتقال إلى الإدراة المدنية الإسرائيلية في عام ١٩٨١ في مرتفعات الجولان وانسحاب القوات الإسرائيلية من جنوب لبنان في عام ٢٠٠٠. وفي كلتا الحالتين، يرجع السبب في العوائق الجمة المفروضة على التزويد بالمياه إلى السيطرة الإسرائيلية إما على شكل إجراءات قانونية (مرتفعات الجولان) أو التهديد باستخدام القوة على الحدود (جنوب لبنان). ويدل ذلك على استمرار ممارسات الاحتلال وما بعده التي تجاوزت مبدأ الاحتلال المكتفي بذاته قانونياً – السيطرة الفعلية على أرض أجنبية بفعل قوى مسلحة معادية (أحكام لاهاي ١٩٠٧، المادة رقم ٤٢)- والمنصوص عليه ضمن القانون الإنساني الدولي.

## ٢. مسح آليات التأقلم/ التكيف مع تفاوت توفر المياه

على مدار العقدين أو الثلاثة الأخيرة في مجالات الدراسة، شملت أبرز الممارسات التي يتبعها المزارعون للتكيف مع تفاوت توفر كميات المياه على: زيادة حصاد مياه الأمطار، واختيار أنواع المحاصيل المقاومة للجفاف (مثلاً، الحمضيات والتمور)، والتقليل من المواشي أو الحقول المزروعة والإنتقال من الري بالغمر إلى الري بالتنقيط.

وفي مجالات الدراسة الثلاثة، يعد حصاد المياه من أكثر الطرق شيوعاً وأقلها تكلفة كآلية للتكيف إلا أن الحكومة الإسرائيلية حظرت الاستخدام المتزايد لهذه الطريقة في مرتفعات الجولان المحتلة وغور الأردن (مناطق ج). فأصبح المجال أكبر في التحكم بتغييرنوع المحاصيل. ففي غور الأردن، تم تقليص الإنتاج الفلسطيني من المحاصيل 'العطشى' إلى حد كبير (كالموز والبطيخ والحمضيات) وخسر المزارع موسم المحاصيل الصيفية (كالباذنجان والقرنبيط والبسلة الخضراء) التي أصبحت تزرع فقط في

'لصمود'وثبات سبل العيش. وتتسم فلاحة الأرض بالذاتية السياسية ك'البقاء في الأرض' إما احتفالاً بالفلاح البسيط في مرتفعات الجولان المحتلة أو 'جهاداً' في غور الأردن. وفي دراسة حالتي الضفة الغربية والجولان، برز مفهوم مرجعي شائع خلال الاستبيان الميداني وضمن المجموعات البؤرية تمثل بكلمة 'صمود' والتي تم تطويرها بداية في السياق السياسي الفلسطيني كاستجابة سلمية للممارسات الاحتلالية الإسرائيلية. فأصبح التمسك المعنوي بالأرض أساساً لخيارات سبل العيش التي قد تراها أطراف ثالثة على أنها غير 'منطقية' اقتصادياً، إلا أنها من وجهة نظر المشارك/ المتأثر ضرورية للمقاومة السياسية في وجه لاعب سيادي يعيه (أي المشارك) بأنه عدائي.

## الآثار المترتبة على وضع السياسات

- لا يعتبر جمع ونشر البيانات المتعلقة باستخدام مصادر المياه كافياً للقيام بدراسات تقييمية مؤكدة حول العوامل التي تؤدي إلى تغيير وتيرة توفر ونوعية المياه في منطقة حوض الأردن. فأخذاً بعين الاعتبار الحساسية السياسية التي تتعلق بالبيانات الوطنية لاستخدام المياه، يسمح التنسيق العلمي -ما بين أطراف منطقة الحوض المائي- بخصوص جمع وتحليل المعلومات الجوية والمائية الإقليمية بالقيام بتحسينات تقنية على مستوى تقييم الآثار المناخية المشتركة على مصادر المياه.
- يركز هذا المشروع البحثي وعبر مجالات الدراسة الثلاثة فيه على الوسائل المتعددة التي يستخدمها المزارعون للتكيف مع التفاوت في توفر المياه. وقد عكست معظم استراتيجيات التأقلم هذه الاستجابة في التكيف لتحمل التخفيضات في كميات المياه المتوفرة، الأمر الذي يشير إلى الصمود في وجه الإجهاد المائي الناجم عن العوامل المناخية. ولكن، يجب ان تقر سياسات الاستجابة بأنه - ووفقاً لاولئك الذين شملهم الاستبيان- يرجع السبب الرئيسي في الشح الفيزيائي لمصادر المياه و/أو النوعية الردئية للمياه الزراعية المتوفرة إلى ظروف الاحتلال وما بعده.
- تعتبر جمعيات المزارعين أكثر الوسائل المؤسساتية تشجيعاً من حيث دعم التوجه الجماعي الفعال للاستجابة إلى شح المياه. وتتمثل أفضل سبل الدعم الداخلي والخارجي للتعزيز المؤسساتي في مجال إدارة المياه بتلك الموجهة نحو دعم جمعيات المزارعين المستقلة التي طورت-وبحسب كافة مجالات الدراسة- مقدرة مستقلة بمنهجية 'من أسفل للأعلى' للتكيف مع التفاوت في توفر المياه.
- يجب أن تشكل دراسة الحقوق والاحتياجات المائية للمجتمعات المتأثرة خط الأساس بالنسبة لتدخلات الدول المانحة الساعية إلى معالجة قضية انعدام الأمن المناخي والمائي في ظل ظروف الاحتلال وما بعده في حوض نهر الأردن. ويجب على كافة اللاعبين الدوليين المهتمين بتقليص 'الحساسية المناخية' للمجتمعات الزراعية الصغيرة في مناطق تعاني من آثار الاحتلال وما بعده في حوض الأردن احترام وتطبيق القوانين الدولية بما في ذلك القانون الإنساني الدولي وقانون المياه الدولي وقانون حقوق الإنسان الدولي.

فصل الشتاء. ولوحظ أيضاً توجهات مماثلة في تغيير أنواع محاصيل وتقليص زراعة أخرى في مرتفعات الجولان وحتى في الجنوب اللبناني ولكن بدرجة أقل (حيث الإجهاد المائي هناك أقل وضوحاً). وتفضل المنطقتان المذكورتان زراعة الفاكهة بالرغم من التوجه الأكبر لزراعة نوع واحد من المحاصيل في مرتفعات الجولان.

لقد بدأ استخدام الري بالتنقيط في مرتفعات الجولان المحتلة بعد احتلالها من قبل اسرائيل عام ١٩٦٧ مما يشير إلى كون انتقال التكنولوجيا في هذا المجال كنتاج للاحتلال، إذ أظهرت دراسة مسحية لأسر المزارعين بأن ٨٠٪منهم بيّنوا انتقالهم من الري بالغمر إلى الري بالتنقيط منذ ٣٥-٥ عاماً. وقد شهد مزارعو الضفة الغربية لطريقة الري بالتنقيط بأنها من أكثر آليات التكيف فعالية بالرغم من أن تقليص المياه كماً ونوعاً يعني في بعض الأحيان فشل هذه الطريقة أيضاً في تلبية الاحتياجات الزراعية، الأمر الذي يرغمهم على تقليص حجم الحقول المزروعة. أما في الجنوب اللبناني، لقي تغيير طريقة الري أهمية أقل بالنسبة للمزارعين هناك (١٠٪ منهم فقط أفادوا بأنها من إحدى آليات التكيف) على الرغم من أن أضرار الاحتلال وما بعده بالأصول الزراعية تخفض بشكل كبير من الرغبة في تغيير طريقة الري.

ومن إحدى ممارسات التكيف الأخرى المتبعة في غور الأردن وجنوب لبنان هي الهجرة المؤقتة أو الدائمة إلا أنه من الصعب قياسها. ففي غور الاردن، مثلاً، انتقل المزارعون من منطقتي الجفتلك والعوجة إلى مناطق فلسطينية تعاني درجات أقل من الإجهاد المائي بغية الاستمرار في الزراعة والانتقال أيضاً إلى العمل المأجور داخل المستوطنات الإسرائيلية. وبإخضاع المزارعين الفلسطينيين للعمل المأجور، تتعمق الجدوى الاقتصادية للاحتلال وشرعيته. أما بالنسبة للمجموعة البؤرية في جنوب لبنان، اعتبرت الهجرة القسرية للمزارعين من أبرز آليات التكيف، إلا أنه لا توجد احصائيات دقيقة تصف هذه التحركات السكانية حيث أصبحت التقديرات الموجودة في المناطق الريفية غير دقيقة/ مؤكدة نظراً للنزوح الحالي الملحوظ للاجئين من سوريا.

## ٣. تقييم الآثار التكيفية لاستراتيجيات سبل العيش الزراعي وخيارات سبل العيش الريفي في ظل ظروف الاحتلال وما بعده

لقد ميزت كل من منهجيتي الدراسة الاستبيانية والمجموعات البؤرية المتبعتين في هذا المشروع البحثي ما بين إجراءات التكيف قصيرة الأمد والطويلة الأمد في سياق التفاوت في توفر المياه نظراً لظروف الاحتلال وما بعده. هل تعد استراتيجيات وممارسات سبل عيش المزراعين كافية لمواجهة حالات جديدة من الإجهاد المناخي في المستقبل؟

في مجالات الدراسة الثلاثة على وجه العموم، وجد بأن جمعيات المزراعين المستقلة هي أكثر الجهات فعالية لتحسين قدرة المزارعين على التكيف مع الإجهاد المائي المستمر (مثلاً، نظام 'الشراكة' في الضفة الغربية والثلاجات المملوكة جماعياً في مرتفعات الجولان لتخزين التفاح). ولا تعد هذه النتيجة مفاجئة على الإطلاق نظراً لغياب المؤسسات الحكومية الداعمة التي عادت ما تكون إما ضعيفة ( الحكومة اللبنانية والسلطة الفلسطينية) أو عدائية (دولة إسرائيل). فيصبح العمل الجماعي لحفظ الحقوق الزراعية المشتركة وجهاً من أوجه تقرير المصير ضمن منطقة متنازعة السيادة.

وكما أوصت المجموعات البؤرية الإقليمية، تختلف إجراءات التكيف المقترحة ضمن مجالات الدراسة الثلاثة وفقاً لظروف الحكم الخاصة بكل منطقة. وقد ركزت كل مجموعة بؤرية على أفضل طرق الدعم الحكومي للمزارعين بما يشمل الاهتمام بالجوانب التقنية والإقتصادية والتزويد بالأراضي. ويُنظر إلى ممارسات التكيف الحالية عامةً على أنها نماذج للتكيف مع الإجهاد المناخي المستقبلي مشروطة بالدعم الحكومي لتعميمها. لكن لا تزال تشكل الممارسات العسكرية والأمنية الإسرائيلية في كافة المناطق العائق الأكبر أمام التعزيز المؤسساتي لقطاع الزراعة: فما زالت عملية صيانة وتطوير سبل العيش الزراعي معرقلة إلى حد كبير من قبل الممارسات الحاكمية الاستثنائية التي تميز ضد المجتمعات العربية/ الدرزية المتأثرة بشكل ممنهج. حتى ولو كان التهديد باستخدام السلاح نادراً، يعتبر تسنيد الأراضي والمصادر المائية في المناطق الثلاثة مقوضاً لأية عملية تنموية زراعية. ويظهر ذلك جلياً في مرتفعات الجولان المحتلة وغور الاردن حيث تكثيف عمليات الضم والاستيلاء، وبشكل مماثل يبقى خطر العنف المحدق بالمزارعين اللبنانيين على الحدود الجنوبية الشرقية لحوض نهر الحصباني موهناً لسبل العيش الزراعية هناك.

وفي ظل ظروف الاحتلال وما بعده، تبرز سبل العيش الزراعية في مجالات الدراسة الثلاثة على أنها شكل من أشكال مقاومة السلطة والسيطرة الإسرائيلية الأمر الذي يشير إلى كون الهوية الاجتماعية المشتركة مصدراً

# Introduction

Funded generously by the Emirates Foundation for Philanthropy through the LSE Middle East Centre, the 'Transboundary Climate Security' research project was undertaken by a partnership between LSE and Birzeit University, Palestine. It began in June 2012 and formally ended in June 2014. The research addresses climate vulnerable rural communities within territories of the watershed of the Jordan River with current or historically recent experience of military occupation (the occupied Golan Heights, the occupied Palestinian territory, and southern Lebanon).

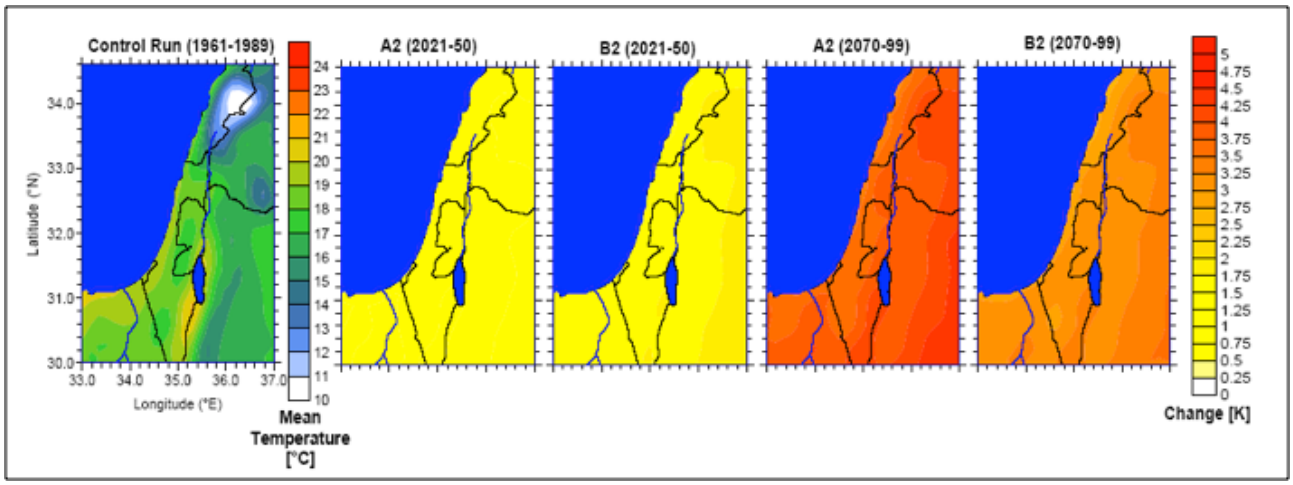
The Jordan River is perhaps the most physically and politically stressed river basin in the world. It flows north to south for 223km, discharging into the Dead Sea: its principal headwaters, the Hasbani, Dan and Banias Rivers, are fed by groundwater sources and spring-led surface runoff (ESCWA-BGR Cooperation Project 2013: 170). Dams and water abstraction from 1964 onwards have reduced the river's original flow, measured at the entrance to the Dead Sea, from roughly 1,300 million cubic metres a year (MCM/y) down to 20-200 MCM/y (Courcier et al. 2005; Zeitoun et al. 2012).

There are enduring asymmetries in water extraction from the Jordan River Basin: Israel extracts between 580-640 MCM/y, Syria withdraws about 450 MCM/y and Jordan withdraws about 290 MCM/y. In contrast, Lebanon only abstracts an estimated 9-10 MCM/y (in the Hasbani sub-basin), while Palestine has no access to the Jordan River and faces severe restrictions in accessing other water sources in the basin (ESCWA-BGR Cooperation Project 2013: 171, 202).

At its end point at the Dead Sea, the Jordan River is little more than a small stream of untreated wastewater and agricultural drainage (Mimi and Sawalhi 2003; FOEME 2005). The pressures on the basin are forecast to be accentuated by climate change: over the course of this century, and depending on the global emissions scenario employed, there is projected to be: (i) a decrease in precipitation of up to 28% (with significant seasonal variation), (ii) a significant warming of between 0.6°C and 4.0°C, and (iii) a tendency towards more extreme weather events. Associated impacts include an increased probability of flash floods, droughts, desertification and saline intrusion into groundwater (Cruz et al. 2007; Hoerling

**Figure 1.1: Mean Temperature of the Control Period (1961-1989) and Future Changes for the Two IPCC Scenarios A2 and B2**

*Source: GLOWA 2008*



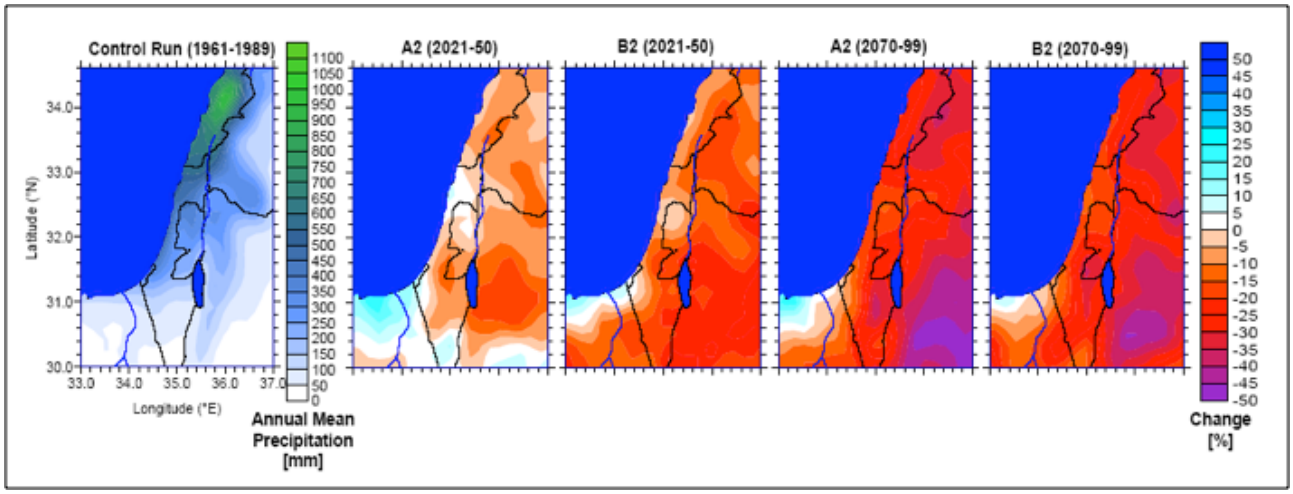
et al. 2012; Kunstmann et al. 2007; Lelieveld et al. 2012; UNDP 2010; World Bank 2012; IPCC 2013: 14.1). These biophysical stresses are likely to impact on human development goals and regional peace efforts (Feitelson et al. 2012; Mizyed 2009; Trondalen 2009; Phillips 2010).

Figure 1.1 shows the projections from the regional downscaling of a global climate model (GCM) ECHAM4 according to two Intergovernmental Panel on Climate Change (IPCC) emissions scenarios A2 and B2 (GLOWA 2008).[1] With 1961-1989 serving as a control run representing current climate, both scenarios, by 2050, feature the same temperature increase of 1.5-1.7 °C. By the end of the century, however, the increase of mean temperatures in scenario A2 at 3.5-4.5 °C is significantly higher than in B2 (2.7-3 °C).

Figure 1.2 shows GLOWA precipitation projections, with most parts of the region facing decreasing yearly amounts by 2050, especially in scenario B2. But there are also some areas where increasing rainfall can be seen (especially in scenario A2), and high yearly variability limits the significance of these projections. As the time series is extended to 2099, in both scenarios the linear trend to decreased rainfall amounts is highly significant. For the period 2070 – 2099 in comparison to the control run (1961-1989), changes range from -10% to -40% in both scenarios with higher reductions in scenario A2. It is claimed that seasonal patterns will be amplified, with more intense summer droughts and more severe rainfall events, even with overall falls in precipitation (GLOWA 2008).

**Figure 1.2: Mean Annual Precipitation of the Control Period (1961-1989) and Relative Future Changes for the Two IPCC Scenarios A2 and B2**

*Source: GLOWA 2008*




[1] Of the two scenarios, B2 is the more ecologically benign in terms of global economic growth and development (e.g. assumption of slower population growth). The simulations were conducted for the two IPCC emission scenarios from 1961 – 2099 up to a resolution of 18 x 18 km².

Despite continuing uncertainties in climate modelling and projections, there is agreement amongst climate scientists that significant climate change is likely in the Jordan Basin region over the current century. At the start of this project the plan was to undertake research in all the riparian territories of the Jordan Basin, with a focus on areas with high projected climate change effects (notably in terms of precipitation and temperature changes). After discussion on current drivers of social vulnerability in the region, participants at the first project workshop (Amman July 13-14 2012) agreed to focus on the climate vulnerability of Jordan Basin farming communities with current or historically recent experience of Israeli military occupation: we label this common geopolitical context '*(post)occupation*'. Our definition was informed by recognised definitions of occupation under international humanitarian law, notably Article 42 of the Hague Regulations 1907: 'Territory is considered occupied when it is actually placed under the authority of the hostile army' (ICRC 2014) and relevant UN Security Council Resolutions. In practice, this meant that the project research focused geographically on the Jordan Rift Valley, West Bank ('current occupation'), the occupied Golan Heights ('current occupation') and southern Lebanon ('post-occupation'). *This research project is the first comparative study of climate vulnerability in conditions of (post)occupation*.

The project co-directors were Dr Michael Mason (Department of Geography and Environment, LSE) and Dr Ziad Mimi (Civil Engineering Department, Birzeit University). There was a project consultant, Dr Mark Zeitoun (School of International Development, University of East Anglia) and five project researchers:

- Ms Janan Mousa (Project Researcher for the West Bank)
- Ms Muna Dajani (Project Researcher for the Golan Heights)
- Dr Mohamad Khawlie (Lead Project Researcher for southern Lebanon)
- Ms Sireen Abu-Jamous (Project Researcher for the West Bank)
- Mr Hussam Hussein (General Project Researcher)

In order to facilitate access to farmers in the occupied Golan Heights, the project also employed as a consultant Dr Taiseer Maray, director of the NGO Golan for Development.

## Research Aims

The key academic objective of the research project was to understand climate vulnerability and adaptation under conditions of (post)occupation. There was also a research impact objective to develop improved policy responses for climate risk management within the Jordan River Basin.

Firstly, the study examined the *climate vulnerability* of selected local populations. Climate vulnerability was understood in *both* biophysical and social terms, thereby integrating climate and non-climatic risks to livelihoods. The project conducted an in-depth examination of human climate vulnerability – in terms of water use and availability – in predominantly Arab rural communities across different riparian territories of the Jordan River Basin. Given the human development importance and climate sensitivity of the agricultural sector in the region, agricultural areas with high climate vulnerability were initially selected for study (see Figure 1.3). These communities were identified from an initial scoping research on agricultural livelihoods in the region. With the governance focus of the project on (post)-occupation contexts, three research areas were identified – the Hasbani Sub-Basin (southern Lebanon), the occupied Golan Heights and the Jordan Rift Valley (West Bank). Figure 1.3 shows their location within the Jordan River Basin.

**Figure 1.3: The Jordan River Basin Showing the Three Study Areas**

*Source: ESCWA-BGR Cooperation Project 2013: 173*

Secondly, the study sought to understand how individuals and communities experience climate variability and change as *a process of short-term coping and longer-term adaptation*. By applying a 'bottom up' perspective to the climate change problematic, this approach focused on the agency of vulnerable people in affected areas, surveying locally sourced coping mechanisms (e.g. rainwater harvesting, crop or ruminant selection) and examining their potential to contribute to more resilient climate adaptation strategies. To address these objectives, the project addressed five research aims:

- To conceptualise and define climate vulnerability;
- To identify the main determinants of climate vulnerability for selected rural communities in the region;
- To determine how current methods of adaptation by vulnerable rural communities serve to increase resilience to climate and other human security threats;
- To examine how state practices affect the capacity of vulnerable rural communities to cope with climate hazards;
- To inform policy processes aimed at reducing regional climate vulnerability.

The working hypothesis for the research was that *the short-term coping mechanisms used by rural communities exposed to differential water availability under (post)occupation negatively affect their capacity to adapt to additional climate stresses*. A community's 'adaptive capacity' is understood to mean its long-term ability to adapt to changes that strain normal coping mechanisms – and the relative ease or pain with which that occurs. The study's findings will ultimately contribute to the climate vulnerability knowledge and policy base of the region, as well as academic and policy communities.

## Summary of Project Activities

In the first year of the project, there was a launch workshop in Amman, baseline data collection, the first stage of field research and an assessment workshop in London (to review empirical findings). This was followed, in the second year, by a second stage of field research and a final workshop in Umm Qais, Jordan (November 2013).

### Amman Workshop (13-14 July 2012)

The launch workshop for the project took place on 13-14 July, 2012 in Amman, Jordan. The workshop reviewed the project aims, discussing relevant conceptual frameworks and methodologies. It also agreed a more detailed timeline for the project, as well as responsibilities for deliverables across the project team.

### Baseline Data Collection and Pilot Questionnaires

Baseline data collection took place between July and December 2012: it included a review of relevant climate and development/humanitarian literature, identification of representative rural communities, elaboration of an agreed analytical framework (on conflict and environmental stress), and development of a household questionnaire for farmers. The questionnaire was pilot tested in the West Bank with feedback discussed by the project team. A separate scoping survey in southern Lebanon (focused on human security concerns) also fed into the final questionnaire. This revised questionnaire was administered in framing villages across the three regions of study – all facing or with recent historical experience of military occupation.

## Field research I (January-April 2013)

The first stage of field research – the household survey of selected farming communities – took place in the first quarter of 2013. The final questionnaire was comprehensive, and in hindsight too long. However, 37 questionnaires were completed in the Golan Heights, 57 questionnaires were completed in the West Bank and 300 in southern Lebanon (Hasbani region).

## Assessment Workshop (1-2 May 2013, LSE)

The second project workshop was held at LSE on 1-2 May 2013. On the first day of this meeting, lead researchers for each of the three study regions presented their initial research findings, with a focus on the results from the household questionnaire. Birzeit University employed a statistician to analyse the questionnaire data for the West Bank and occupied Golan Heights case studies, and at the workshop project participants from this university reported on some preliminary statistical analysis. Statistical analysis of the data for southern Lebanon was done separately and independently. The second day of the workshop featured a group discussion of results so far, a presentation on human security and climate vulnerability, and a brainstorming exercise on how the initial results should feed into the second stage of the research project (focus groups and interviews). A timeline was agreed for the last part of the project.

## Field Research II (July-September 2013)

Follow-up field research with focus groups in the three regions examining the interactions between, biophysical and social vulnerability.

## Final Research Workshop (12-14 November 2013, Umm Qais, Jordan)

Presentation of findings; explanation of trends and differences; consensus on interaction between biophysical and social vulnerability; generation of potential policy implications deriving from project.

# Understanding Climate Vulnerability

Mark Zeitoun and Michael Mason

Vulnerability science has evolved from a technical preoccupation with hazards management and climate prediction to a more sociologically nuanced examination of risk assessment, adaptive capacity, perceptions of vulnerability and the implications for governance (Adger et al. 2006; Füssel 2007; Patt et al. 2009; Smit and Wandel 2006). This core academic discourse has spawned several conceptual debates and specialist streams of research. Work on the impact of climate change on water resource quantity and quality predicts that while some areas will experience more rain, others – including the Eastern Mediterranean – will experience greater drought and decreased water quality (Chenoweth et al. 2011; Kiparsky et al. 2012; Sowers et al. 2011). 'Climate vulnerability' has been conceptualised to examine both the biophysical and social effects of climate and environmental variability.[2] Understood partly in terms of a lack of adaptive capacity, the exploration of vulnerability has led to important intellectual contributions such as 'environmental criticality' (Kasperson et al. 1999), adaptation justice (Adger et al. 2006) and adaptation thresholds (Brooks 2004). Studies on social adaptive capacity have related, for example, changes in water availability with a community's economic and institutional ability to deal with that change (Allan 2001, Moench et al. 2003, Wolf 2007).

Exploration into links between rural livelihoods, water and climate adaptation in developed countries has found responses to reduction in water availability consisting of crop-switching or investment in increased water supply or storage capacity (e.g. Weatherhead et al. 2005). Farmers in the lower capacity and less-regulated contexts of developing countries have fewer options, and are predicted to suffer greater consequences (e.g. Below et al. 2012; Gbetibouo 2009; Osbahr et al. 2008), including in the Middle East (e.g. Issam Fares Institute for Public Policy and International Affairs 2014; World Bank 2012). Development paths aimed at increasing adaptive capacity are being pursued by a large number of development agencies and lending banks (IWMI 2007a; IWMI 2007b; Thornton et al. 2006; UNDP 2007; UNEP 2007; World Bank 2012) and are informing related academic research (Brown and Westaway 2011; Engle 2011; Hill and Engle 2013).

While the existing body of work on vulnerability is a necessary starting point, it is confined by at least four conceptual limitations. The first is *the use of inappropriate scales.* Macro-level studies map out vulnerability at the continental scale (EEA 2007; Muller 2007; Thornton et al. 2006), obscuring social-ecological practices at the community level.[3] National and city level research, on the other hand, ignores the challenges posed by international political borders (Alam and Rabbani 2007; Chaponniere and Smakhtin 2006). This project's use of a transboundary river basin (roughly the size of the Thames) as an ecologically-delimited and transboundary unit of analysis is expected to provide relevant and transferable lessons. Moreover, examining (post)occupation contexts within the same basin enables comparative insights into exceptional governance mechanisms which are usually examined as separate territorial spaces.

A second limiting feature of previous research is *a narrow political scope.* The risks associated with climate vulnerability are increasingly represented as a source of additional insecurity or 'threat multiplier' in unstable regions in the world (Abbott 2008; CNA

[2] Social vulnerability is a measure of a society to adapt to hazards of different natures, including: biophysical hazards, changes in political context, disruption to livelihoods, etc. (Vincent 2004; UNEP 2007).

[3] Thornton et. al. (2006: 4) highlight the problem with continental-scale studies: 'Even allowing for the technical problems and uncertainties associated with this analysis, it is clear that macro-level analyses, while useful, can hide enormous variability concerning what may be complex responses to climate change'.

2008; Lee 2009; WBGU 2008). Establishing whether and how resilience to physical forces may affect resilience to social forces – or vice versa – is crucial to understanding the implications held for the broader political and security context. We remain unsure how risks and responses translate across these sectors and across boundaries; for instance, how drought-increased political tension at the state and international levels may render the communities in question ever more socially vulnerable. The work by the Tyndall Centre (Brooks 2004; Vincent 2004; Adger et al. 2006) on issues of fairness in adaptation to climate change broke important ground in this regard. Power-related ideological, economic and institutional drivers remain to be robustly incorporated into this stream, however. For the exceptional governance contexts of (post)occupation, where coercive power is omnipresent, this analytical need is even greater. The project builds on earlier work (Mason et al. 2011; Mason et al. 2012) addressing climate vulnerability in the occupied Palestinian territory. In a wider regional context, the political landscape of the Jordan River basin features territorial tensions: in the last century the borders have been re-drawn on several occasions from a single political entity to the current five, entailing significant population transfers, violence and restricted water access.

Third, key temporal aspects of the influence of political and climate change on local adaptation practices have not been properly conceptualised; most notably their *episodic*, *cyclical* and *chronic* features. Sudden changes in the political context may lead to communities investing in means of reactive measures of protection (e.g. armed or legal), while relatively routine and medium-term seasonal variation is likely to be dealt with through precautionary measures, such as food storage. In the sense that they may evoke similar responses, major political events (such as a civil war) may be likened to major climatic events (such as an earthquake). Likewise, coping methods developed for seasonal changes may be of limited use when confronting the much more gradual changes in water stress forecast by the regional climate change models, yet issues related to rates of change remain under-studied. One of the project's objectives is to provide an integrative manner of incorporating the temporal aspects of environmental and political-economic change.

Finally, vulnerability science has, thus far, inappropriately absorbed research from basic development disciplines about the *political economy of water scarcity*. Water scarcity thresholds (Falkenmark 2001), for example, have been uncritically taken on board (Mutembwa 1998; WBGU 2008), while insights into the constructed nature and economic features of scarcity (Falkenmark et al. 2007; IWMI 2007a; Mehta 2001) have proven their limitations. Likewise, insufficient attention has been given to the significant mitigating qualities of 'virtual water' (water imported in the form of food), which silently relieves communities of the otherwise expected devastating effects of being water or food insecure (Allan 2002; Biro 2012; Kumar and Singh 2005).

This project is designed to addresses these shortcomings through an examination of adaptation of rural communities in a transboundary context to climate and political changes. The rural communities that once depended on the Jordan River for domestic and agricultural purposes have responded to changes in political context and water availability in a wide variety of ways, providing a fertile empirical context for vulnerability and adaptation analysis. Following the move by the IPCC to a more integrative understanding of vulnerability (e.g. IPCC 2012: 5; IPCC 2014: 4), we define climate vulnerability as *the propensity or predisposition to be adversely affected by climate-related hazards or stresses*. As they seem to affect (both directly and indirectly) the exposure, sensitivity and adaptive capacity of people to climate-related stresses, we posit that *(post)occupation practices are structurally constitutive of climate vulnerability*.

From the academic literature on climate vulnerability in poorer countries, a key proposition is that the coping mechanisms used by rural communities to maintain existing livelihood systems can work against longer–term adaptation to climate change stresses (Jerneck and Olsson 2010: 287; O'Brien et al. 2008: 195). This proposition directly informs our working hypothesis that:

*The coping mechanisms used by rural communities exposed to differential water availability under (post)occupation negatively affect their capacity to adapt to additional climate stresses.*

The reference here to (post)occupation is crucial, for livelihood strategies in contexts of strong coercive power are of course even more precarious (Collinson 2003; Lautze and Raven-Roberts 2006). The project seeks to investigate how rural households exposed to differential water availability perceive, and respond to, a challenging nexus of conflict- and climate-related stresses.

*Photo taken from the inside of an old IDF pillbox, on Lebanese/Syrian border at Jabal al-Shaykh/Mount Hermon.*

# Methodology

Janan Mousa (lead author)

The particular security and political context of the Jordan River Basin dictated a resilient methodology. The project management was initiated and concluded through two workshops held in Jordan – Workshop 1 (Amman, July 2012) and Workshop 2 (Umm Qais, November 2013). Country-level researchers led the methodological investigations of the vulnerable rural communities in Jordan, the occupied Golan Heights and the West Bank. These researchers met together and with the Principal Investigators and Project Consultant in the first of the two workshops to refine the original research plan, and agree on the criteria for selection of marginalised communities. The revised research plan was further modified following consultation with the members of the communities concerned. Recent climate change prediction projections were used to generate water availability scenarios. Primary data (both quantitative and qualitative) was gathered sequentially through questionnaires and then focus groups testing, and building on, the results of the questionnaires. Table 3.1 summarises the data collected in relation to the research aims on climate vulnerability (biophysical and social), adaptive capacity and regional governance responses. The second workshop towards the end of the project brought together the research findings and developed conclusions on climate vulnerability and human security for the studied communities.

The Principal Investigators, advised by the Project Consultant, monitored the execution of the research (including running the workshops), wrote-up the final report and are responsible for disseminating the research. The forging of collaborative links with local researchers was designed to build regional capacity for environmental knowledge transfer.

**Table 3.1: Data Collection**

| Research Question | Data Collected | Source |
|---|---|---|
| Biophysical Vulnerability | Climate change predictions; Projected trends in precipitation and water availability | Peer-reviewed climate science and regional climate models |
| | Record of seasonal climatic data; Seasonal variation | Ministries of water, agriculture |
| | Severe weather patterns; Elements (shelter) | Ministries of water, agriculture |
| Social Vulnerability | Water – livelihoods links; Dependence on water for livelihoods | Field research |
| | Mapping of institutional network; Institutional stability | Ministries of water, agriculture, field surveys |
| | Civil rights, legal status, quality of basic services; Marginalisation by state or regional government | Field surveys, reports from human rights groups |
| | Micro and macro-economic factors; Global interconnectivity | FAO Faostat, ministries of planning |
| | Cost of living, incomes, alternative financial sources; Livelihoods assessment | Field surveys, ministries of planning, grey literature of development agencies |
| Climate Coping and Adaptation | Assessment of current coping mechanisms, available water sources (quantity, quality, access, reliability), food trade, livelihoods, diversity of economy, social adaptive capacity | Field surveys and focus groups, village councils |
| Domestic Capacity-Building | Current policies, current plans, donor interventions. | Ministries of water, agriculture, planning |

## Rapid Rural Assessment and Pilot Questionnaires

In order to assess vulnerability and potential adaptive capacity in the designated study areas, researchers began by adopting a rapid rural assessment (RRA) approach. This allowed for research concepts to be framed according to local conditions and facilitated baseline data collection for study area profiles. During August 2012, field researchers conducted two field visits to the West Bank and occupied Golan Heights. For the first visit to the West Bank, researchers travelled to the villages of Jiftlik and Al-Auja, both in the Jordan Valley. The second visit was to the town of Majd al-Shams, in the occupied Golan Heights. The RRA visits included informal meetings with village council heads, NGO heads, and local farmers. Field researchers informally discussed climate conditions, farming conditions, and water availability in an attempt to capture the locally-specific parameters of the study concepts. These concepts included biophysical and social vulnerability, coping, and adaptation. An additional scoping survey (focused on climate vulnerability in the context of human insecurity) was carried out in November 2012 across the southern Lebanese study area. The findings of this survey generated data for the study profile of the Hasbani Watershed.

This initial scoping research and baseline data collection across the three study areas informed the development of a draft survey questionnaire on climate vulnerability, coping strategies and adaptive capacity. In order to test this survey questionnaire in the field, in December 2012 researchers conducted a pilot survey with 30 respondents in the West Bank. Based on the practical experience of administering the pilot questionnaire, some minor changes were made to the final version. The data collected during the pilot study was also included in the research findings, although there were minor differences between the pilot questionnaire and the final version.

## Field Research I (January - April 2013)

After discussion, the project team agreed a final, revised questionnaire designed to capture local conditions and understandings of climate vulnerability in relation to the research aims. Thus, the questionnaire:

- measured both biophysical and human (economic, political and social) dimensions of climate vulnerability;
- surveyed short-term coping mechanisms;
- surveyed current and potential adaptive capacity;
- ascertained the scope and nature of (post)occupational practices;
- elicited perceptions on the effectiveness of domestic governmental interventions in reducing climate vulnerability.

Each question addressed a particular aspect of climate vulnerability, and cumulatively addressed the research aims. In this process, coping and adaptive capacity were identified as the dependent variables, with the principal independent variables encompassing biophysical and human (social, economic and political) vulnerability. (Post)occupation practices were posited as partly constitutive of climate vulnerability.

In designing the research instruments, researchers included both quantitative (categorical) and qualitative questions; the former consists of numerical, ordinal, and nominal questions. The questionnaire was divided into sections, each reflecting a particular research theme or category. These include: demographic concepts/variables; water; product; land; climatic changes; coping and adaptation; political conditions, overall needs, and vision for the future; and finally, economic situation. Once the instruments were designed, researchers established the conceptual validity of the questionnaire through its critical review by the project research team.

Comparative case study research allows for high levels of conceptual validity (George and Bennett 2005: 19); in this case by considering in detail, across three territorial spaces, the climate vulnerability of rural communities affected by (post)occupation.

The survey was administered in farming villages across the three regions of study – all facing or with recent historical experience of military occupation. The sampling strategy used was convenience sampling, arrived at by default, and by virtue of the inherent difficulties involved in locating, meeting, and interviewing famers in the study regions.

The sample in the West Bank was conducted in 11 communities – which includes villages and towns – comprising 58 respondents. This figure includes the 30 questionnaire interviews conducted during the pilot study. Study locations were selected to ensure that northern, middle, and southern regions of the Jordan Rift Valley were covered. Selection criteria also aimed to target communities that are subjected to varying water conditions, have access to varying numbers of water resources, and utilize varying cultivation practices. Table 3.2 below shows the West Bank communities surveyed in this study.

**Table 3.2: West Bank Communities Surveyed**

| Number | Community | Governorate | No. of questionnaires |
|---|---|---|---|
| 1 | Al –Jiftlik | Jericho | 12 |
| 2 | Al – Auja | Jericho | 15 |
| 3 | Tubas | Tubas | 4 |
| 4 | Ras Al Fara'a | Tubas | 7 |
| 5 | Froush Beit Dajan | Nablus | 5 |
| 6 | Marj Na'ajeh | Jericho | 2 |
| 7 | Nwei'meh | Jericho | 3 |
| 8 | Jericho | Jericho | 3 |
| 9 | Dyouk | Jericho | 3 |
| 10 | Zubeidat | Jericho | 2 |
| 11 | Marj Ghazal | Jericho | 1 |

The sample in the Golan Heights was conducted in two communities, comprising 37 respondents. The two villages were selected after carrying out a few field visits to the Golan Heights, which included meeting with a number of farmers and a leading non-governmental organisation, Golan for Development. The first village selected was Majdal Shams, the capital of the 5 remaining villages, as it encompasses the largest area – both geographically and demographically – and is the village whose residents' main occupation is agricultural production. The main agricultural produce in Majdal Shams are apples and cherries, owing to its high elevation. The second village selected was Ein Qinya, due to its relatively lower elevation, as well as the change in crops suitable for agriculture, such as olive trees. The two villages provide a sample of varying topography, crops, and climatic conditions.

In the Hasbani region of southern Lebanon, the questionnaire was administered purposively across the whole study area, generating 296 responses (Table 3.3). The communities chosen were those most geographically related to the Hasbani River watershed, with numbers of questionnaires reflecting the relative size of the community. Due to the cumulative stressing conditions from Israeli military-security actions over the last few decades, some communities' names that show up on the map (see Figure 6.2) do not show up here because they were marginalized. But the main rural communities of the survey covered the three administrative areas (Cadha') of the region: Rachaya (north), Hasbaya (middle) and Marjeyoun (south) (Table 3.3), with differences in numbers due to what is mentioned above. The questionnaire survey was undertaken by Lebanese Master's students, mostly from the area itself, trained to deliver the survey and accompanied on several field visits by the lead Lebanese researcher. The background of the research, purpose of questionnaire and its content were thoroughly explained to the students and, of course, to the community themselves.

**Table 3.3: Distribution of Survey Sampling Localities in the Hasbani Basin**

| Number | Community | Cadha' | No. of questionnaires |
|---|---|---|---|
| 1 | Aein Arab | Rachaya | 7 |
| 2 | Aein Atta | Hasbaya | 10 |
| 3 | Aein Kenya | Hasbaya | 16 |
| 4 | Al Howsh | Hasbaya | 3 |
| 5 | Amara | Marjeyoun | 8 |
| 6 | Aqaba | Hasbaya | 2 |
| 7 | Arab Iwayze | Rachaya | 2 |
| 8 | Ayha | Hasbaya | 5 |
| 9 | Beire | Rachaya | 5 |
| 10 | Beka | Rachaya | 3 |
| 11 | Bekkifa | Hasbaya | 2 |
| 12 | Ebel essaqy | Marjeyoun | 15 |
| 13 | Halta | Merjeyoun | 5 |
| 14 | Hasbaya | Hasbaya | 27 |
| 15 | Hebbariyeh | Hasbaya | 2 |
| 16 | Kauwkaba | Marjeyoun | 19 |
| 17 | Kfar Hamam | Marjeyoun | 10 |
| 18 | Kfar Meshke | Hasbaya | 2 |
| 19 | Kfardanis | Rachaya | 2 |
| 20 | Kfarshouba | Marjeyoun | 10 |
| 21 | Kfeir | Hasbaya | 10 |
| 22 | Khalwat | Hasbaya | 5 |
| 23 | Kherbet eddweir | Marjeyoun | 3 |
| 24 | Lebbaya | Hasbaya | 3 |
| 25 | Marjeyoun | Marjeyoun | 13 |
| 26 | Mazraet Jaafar | Hasbaya | 3 |
| 27 | Mdoukha | Rachaya | 4 |
| 28 | Mhaydse | Rachaya | 9 |
| 29 | Mimess | Hasbaya | 13 |
| 30 | Qnaba | Hasbaya | 5 |
| 31 | Rafid | Rachaya | 1 |
| 32 | Rashaya | Hasbaya | 10 |
| 33 | Rashaya elwady | Rachaya | 8 |
| 34 | Rfeid | Marjeyoun | 9 |
| 35 | Sarda | Marjeyoun | 7 |
| 36 | Shebaa | Hasbaya | 14 |
| 37 | Shwayya | Hasbaya | 5 |
| 38 | Wazzany | Marjeyoun | 15 |
| 39 | Yenta | Rachaya | 4 |
| | | **Total** | **296** |

| No. of Cadha' | Cadha' Name | Sub-total no. of questionnaires |
|---|---|---|
| 1 | Hasbaya | 103 |
| 2 | Marjeyoun | 127 |
| 3 | Rachaya | 66 |

## Field Research II (July -September 2013)

A second project workshop held at LSE (May 2013) reviewed the questionnaire results from all three study regions. Common themes and questions were identified to feed into the second stage of the research project (Table 3.4). This follow-up field research, employing focus groups within affected communities, examined in more depth the experience of climate vulnerability in (post)occupation contexts, including the role of political identity and gender in livelihood choices. The focus groups took place in Madjal Shams, Golan Heights (August 2013), Hasbaya, Lebanon (September 2013) and Al Jiftlik, West Bank (September 2013).

**Table 3.4: Summary of Major Questionnaire Findings for Focus Group Discussion**

| Grouping | Impact | | | Coping Mechanisms | Adaptive Capacity |
|---|---|---|---|---|---|
| | Israeli | Climate | Other | Farming Practices and Technology & Knowledge | |
| Water | • Prevention & demolition of water infrastructure<br>• Allocation<br>• Pricing<br>• How do Israeli actions (government/military) most affect your farming practices? | Quantity<br>• Have you noticed any changes to the timing of the rainy season? | Quality<br>• What are the most important determinants of water quantity and quality for your farming practices? | • Rainwater harvesting<br>• Crop selection<br>• Reducing cultivated land<br>• Drip irrigation | • To what extent do water conditions affect your farming?<br>• What do you think can be improved to help you keep farming?<br>• How do coping mechanisms affect adaptive capacity? |
| Land | • Land-use restrictions<br>• Land confiscation<br>• Zoning | • Soil quality (salinity, pests, etc.) | | • Crop selection<br>• Crop /livestock reductions & changes<br>• Increased use of pesticides<br>• Agricultural technologies (refrigerators, greenhouses, thermometers) | • How do you assess the current land/farming conditions?<br>• How do you foresee the future of farming under the prevailing climatic and Israeli conditions?<br>• What can be improved? |
| Socio-Economic | • Feelings of insecurity<br>• Israeli market hegemony<br>• Government incentives for settlers | | | • Farmers Associations<br>• Collective action (farmers helping each other out, Jordan Valley) | • How can farming be maintained in your opinion? What type of technical/political/economic assistance do you require?<br>• Role of collective action: What collective mechanisms reduce your vulnerability?<br>• How do they help in adapting to climatic and non-climatic stresses? |

## Data Analysis

In conducting the data analysis, the project team addressed the research and questionnaire aims. In cases where the research aim was descriptive, data analysis techniques were employed to map out the distribution of various characteristics. These included the distribution of all quantitative concepts/variables (e.g. all demographic variables); the distribution of vulnerability across regions – the comparative ambition of the study – as well as the distribution of coping mechanisms across study regions.

In cases where the research aim was explanatory, data analysis techniques were employed to indicate connections and relationships between concepts/variables. These addressed posited determinants of coping according to the questionnaire structure – water availability, household characteristics, perception of climate change, assistance measures, (post) occupation damage – then the relationship between short-term coping and long-term adaption, hence addressing the study hypothesis. The necessary techniques were drawn up to facilitate the process of analyzing the collected data (Table 3.5).

**Table 3.5: Data Analysis**

| Concept(s)/variable(s) to be analysed | Purpose: Descriptive (single variable) or explanatory (relationship between variables) | Data analysis test/technique |
|---|---|---|
| All vulnerability dimensions | Distribution | Cross-tabulation (for percentages of each type of vulnerability according to region) |
| All coping mechanisms | Distribution | Cross-tabulation for percentages of each coping mechanism according to region) |
| Posited determinants and coping mechanisms | Relationship between posited determinants and coping practices (dependent variable) | Cross tabulation (% of observed coping according to vulnerability) |
| Coping mechanisms and adaptive capacity (working hypothesis) | Relationship between coping mechanisms and adaptive capacity | Qualitative analysis |

# Jordan Rift Valley: Study Area Profile

Sireen Abu-Jamous (lead author) and Ziad Mimi

## Area and Population

The Jordan River Basin is located primarily in Israel and the Palestinian territories, but also includes parts of Jordan, Syria, and Lebanon, with a total surface area of roughly 18,000 square kilometers (GENI 2011). The 'Jordan Rift Valley', which herein will be referred to as the study area, is the part of the Jordan River Basin within the West Bank borders which is shared among three governorates including: Jericho & Al Aghwar, Nablus and Tubas, as shown in Figure 4.1 below. It covers 29 Local Government Units (LGUs), consisting of 2 municipalities and 27 village councils (JICA 2008).

Table 4.1 shows the localities included in the study area with the total population and population projection for each locality; projections were calculated with an annual growth rate of 2.7%. Based on this, the total population in the study area is estimated to be about 127,000 in 2014.

The Palestinian Jordan Rift Valley is the eastern section of the West Bank, running adjacent to the Jordan River. Starting at the Dead Sea and extending approximately 70 km north to the border with Israel, the Jordan Rift Valley is approximately 15-20 kilometres wide and, at 1,700 square kilometres, covers around 28.5% of the West Bank (Maan 2012).

**Table 4.1: Localities and Population Projection of the Study Area**

*Source: JICA 2008*

| Locality | Population (est. 2014) |
|---|---|
| Marj Na'ja | 972 |
| Az Zubeidat | 1,698 |
| Marj al Ghazal | 488 |
| Al Jiftlik | 5,575 |
| Fasayel | 1,140 |
| Al 'Auja | 5,080 |
| An Nuwei'ma | 1,476 |
| 'Ein ad Duyuk al Foqa | 1,031 |
| 'Ein ad Duyuk Camp | 2,579 |
| 'Ein ad Duyuk at Tahta | 1,225 |
| Jericho (Ariha) | 25,863 |
| Aqbat Jaber Camp | 8,035 |
| Other Localities | 96 |
| **Total Jericho Governorate** | **55,258** |
| Bardala | 1,998 |
| 'Ein el Beida | 1,370 |

| | |
|---|---|
| Kardala | 209 |
| ‘Aqqaba | 7,693 |
| Tayasir | 3,037 |
| Al Farisiya | 270 |
| Ath Thaghra | 327 |
| Al Malih | 261 |
| Tubas | 20,382 |
| Ras al Far’a | 888 |
| El Far’a Camp | 7,285 |
| Wadi Far’a | 2,966 |
| Tammun | 13,,229 |
| Al Hadidiya | 232 |
| Other localities | 831 |
| **Total Tubas Governorate** | **60,978** |
| Al Badhan | 3,060 |
| An Nassariya | 1,711 |
| Al ‘Aqrabaniya | 1,131 |
| Ein Shibli | 250 |
| Frusush Beit Dajan | 1,465 |
| Talluza | 3,386 |
| **Total Nablus** | **425,056** |
| **Total Wadi Far’a Area** | **11,004** |
| **Total Study Area** | **127,240** |
| **Total Study Area (Excl. Camps)** | **109,340** |

## Topography and Land Use

The landscape and topographic condition in the study area are varied and can be categorized into three types, namely mountainous areas, foothills, and flat areas, (JICA 2008), described as follows:

- Mountainous areas are located in the upstream area of Wadi Far'a. The elevation reaches up to 600 m above sea level;
- Most of the study area is covered by foothills with steep slopes. The elevation of the foothills range from 0 to 200 m above sea level; and
- Flat areas, which are lower than the sea level and have relatively high agricultural production, lie along the Jordan River. The length and width of the areas are about 10 km and 1 to 2 km, respectively.

These general land use features are shown in Figure 4.1, with land cover figures summarised according to zoning of Palestinian and Israeli control in Table 4.2.

Table 4.2 shows that agriculture is the principal land use in the Jordan Rift Valley: it is one of the most important agricultural areas in Palestine. It is considered the food basket for the Palestinians having unique climate conditions that allow the production of food throughout the year (UNICEF 2010). The Jordan Rift Valley area heavily utilizes its agricultural prospects, providing 35% of the total produce distributed to the Palestinians. It produces 60% of the vegetables, 40% of the citrus and 100% of the bananas. This agricultural success is associated with the area's unique location below sea level, which is likened to a giant greenhouse where crops ripen early in the winter (Ma'an 2007). Politically, for the Palestinians, the Jordan Rift Valley offers great potential for a viable state in terms of access/location and economic success. Its borders with Jordan are the only foreseeable entrance/exit for a future Palestinian state (Ma'an 2007).

**Table 4.2: Present Land Use in the Study Area (km$^2$)**

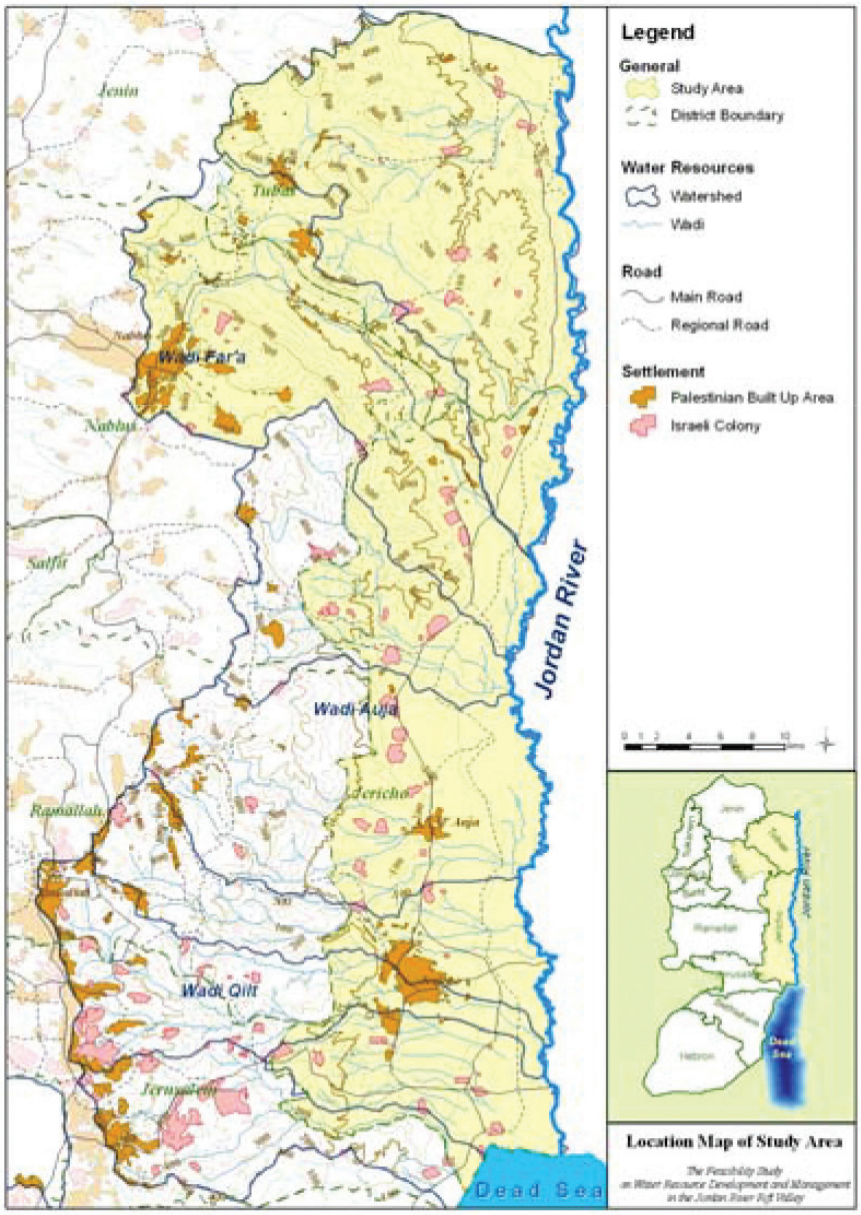
*Source: JICA 2008*

| Land Cover | Area A[4] | Area B | Area C | Total |
|---|---|---|---|---|
| Agricultural Areas | 86 | 36 | 219 | 342 |
| Palestinian Communities | 16 | 2 | 47 | 65 |
| Israeli Settlement | 0 | 0 | 17 | 17 |
| Military Base | 13 | 3 | 67 | 84 |
| Other | 32 | 16 | 537 | 586 |
| **Total** | **148 (13.5%)** | **58 (5.3%)** | **887 (81.2%)** | **1,093 (100%)** |

[4] In the agreements signed between Israel and the PLO, the West Bank is divided into Areas A, B, and C. Area A was transferred to the complete control – security and civil – of the Palestinian Authority; Area B is under Israeli control in security matters and Palestinian control in civilian matters; and Area C, which comprises 60 per cent of the land area of the West Bank, remains under complete Israeli control in all matters – land registration, planning and building, designating land use, and so forth. 'Other' includes rangeland for Bedouin and natural grassland or unused area.

**Figure 4.1: The Jordan Rift Valley**

*Source: JICA 2008*



## Climate

In the Jordan Rift Valley there is a close correlation, both on regional and local scale, between physiographic features, geological structures and climate. Three climatic zones prevail in the study area, (Hotzl et al. 2009: 465-481).

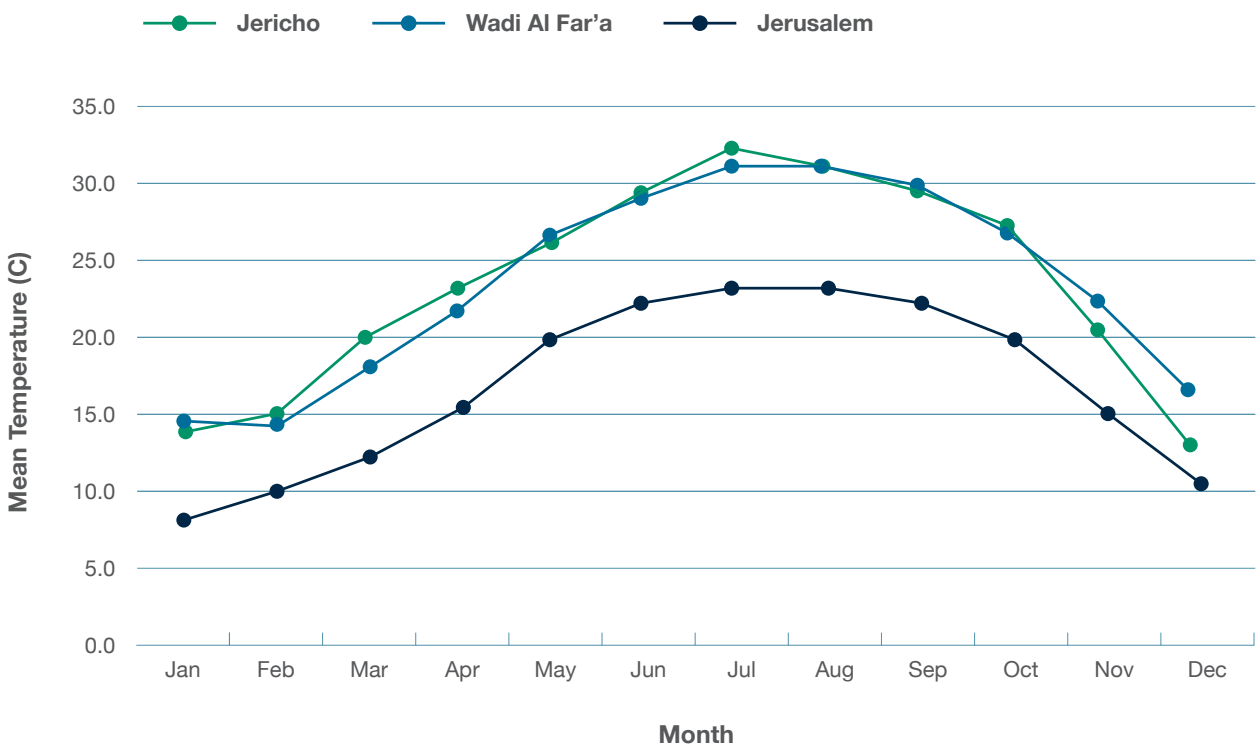
- Mediterranean climate zone: this type of climate prevails along the highlands with precipitation rates of 600-800 mm/yr. and potential evaporation rates of about 1600-1900 mm/yr.
- Arid climate zone: this type of climate prevails in the Jordan Rift Valley. Precipitation rates ranges form 50-150 mm/yr. and the potential evaporation rates reach 2600 mm/yr.
- Semi-arid to Mediterranean climate zone: between the arid zone of the Jordan Rift Valley floor and the Mediterranean zone along the highlands, a transitional zone prevails along the slopes extending from the highlands to the Jordan Rift Valley. This zone receives average precipitation rates ranging from 200-300 mm/yr, with average evaporation of rates from 1900-2400 mm/yr.

### Temperature

Mean monthly temperature in Jericho and Wadi Far'a ranges between a minimum of 13.1°C in December to a maximum of 32.4°C in August, as shown in Figure 4.2.

**Figure 4.2: Mean Monthly Temperature from Jericho Meteorological Station**

*Source: Palestinian Central Bureau of Statistics 2005*



### Precipitation

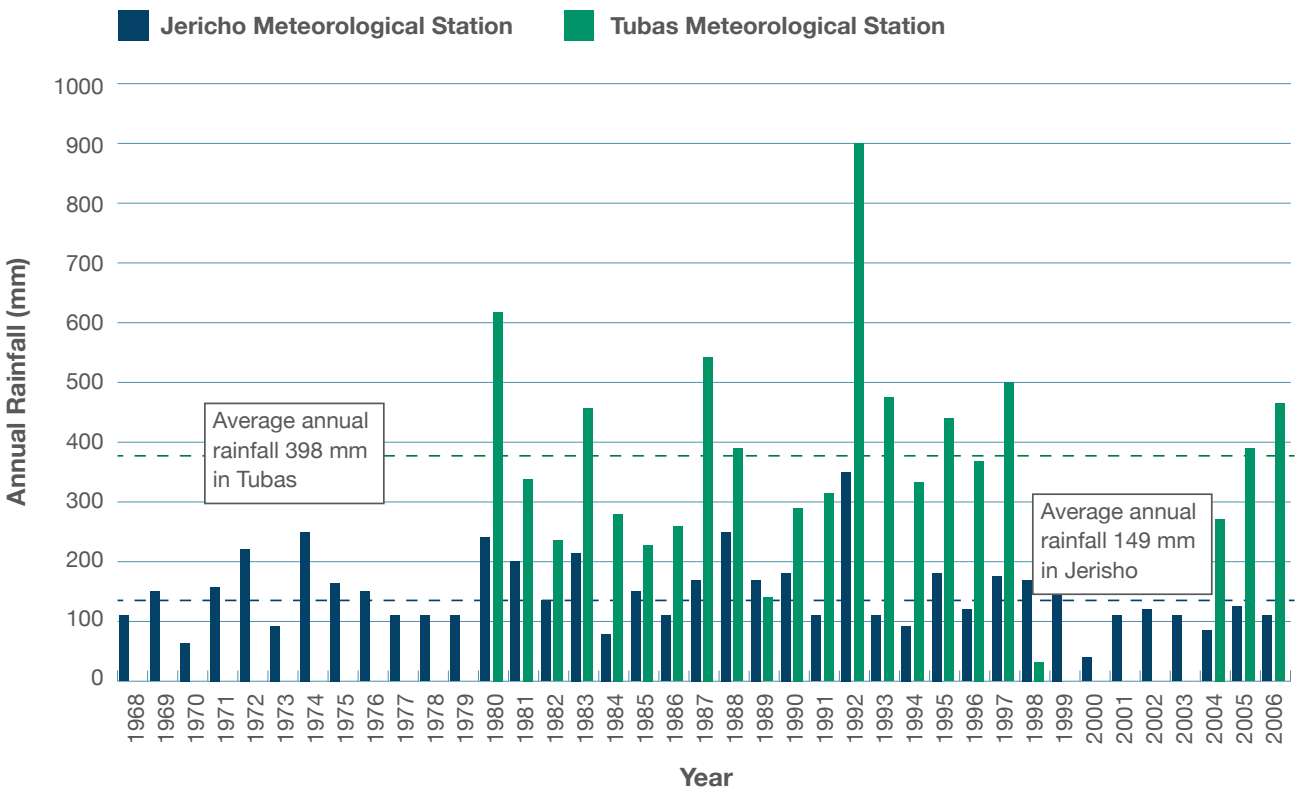
Rainfall in the study area is mainly observed between mid-November and March and is scarce in summer. Figure 4.3 shows the annual average rainfall from Jericho and Tubas meteorological station; located within the study area, for the period 1968-2006.

### Evaporation

Evaporation rates are high due to high temperatures, intensive sunshine and low humidity, particularly during the period of May through September.

**Figure 4.3: Annual Average Rainfall from Jericho and Tubas Meteorological Stations**

*Source: Palestinian Water Authority*



## Water Resources

### Wadis

There are numerous wadis in the study area. The wadis are mainly categorized in nine major wadi basins as shown in Table 4.3. Wadi Fara occupies the largest catchment area of 340 km$^2$. The northern part of the study area including Wadi Fara basin is blessed with abundant vegetation and rainfall. On the other hand, the ratios of low-lying flat and desert areas with annual rainfall of less than 300 mm become relatively larger in the southern wadi basins. Therefore, the rainfall hardly contributes to the yield of water resources in the southern area. The availability of discharge records of the wadis is limited, partly because of lack of utilization of these sources.

### Spring water

There are 114 springs discharging in the West Bank and 24 springs of these are located in the study area. The 24 springs are categorized in 8 groups by locations and origins. The characteristics of the groups are summarized in Table 4.4.

**Table 4.3: Major Wadi Basins in the Study Area**

*Source: JICA 2008*

| No. | Name of Wadi | Catchment Area (Km$^2$) |
|---|---|---|
| 1 | Wadi Hahal Milah | 2776.1 |
| 2 | Wadi Abu Sidra | 120.8 |
| 3 | Wadi Far'a | 336.9 |
| 4 | Wadi Al'Ahmer | 180.1 |
| 5 | Wadi Auja | 291.4 |
| 6 | Wadi Nueima | 152.5 |
| 7 | Wadi Qilt | 172.4 |
| 8 | Wadi Marar | 102.4 |
| 9 | Wadi Mukallak | 140.5 |
| | **Total** | **1773.1** |

**Table 4.4: Springs in the Study Area**

*Source: JICA 2008*

| No. | Spring Group | Basin | Catchment | Total Discharge (MCM/yr) |
|---|---|---|---|---|
| 1 | Nablus Spring Group | North Eastern | Al Far'a | 0.31 |
| 2 | Al Far'a Spring Group | North Eastern | Al Far'a | 6.51 |
| 3 | Badhan Spring Group | North Eastern | Al Far'a | 5.15 |
| 4 | Shibli Spring Group | Eastern | Al Far'a | 2.14 |
| 5 | Fasayil Spring Group | Eastern | Al'Ahmer | 0.66 |
| 6 | Al'Auja Spring Group | Eastern | Al'Auja | 9.55 |
| 7 | Jericho & Dyuke Spring Group | Eastern | Al Nwai'mah | 13.61 |
| 8 | Al Qilt Spring Group | Eastern | Al Qilt | 7.91 |
| | | | **Total** | **45.84** |

### Wells

Wells have played an important role as one of the main sources of water supply for the Palestinians in the study area. Water allocated from the wells and the springs is 95% for agriculture and 5% for human consumption. The number of working agricultural wells in the study area is 88 out of 184 existing wells; the others are non-pumping and abandoned wells. Most of these wells were drilled before 1967 and the wells' condition became worse due to electromechanical, hydro-geological or economic reasons (JICA 2008).

## Water and Occupation

Due to the historical and political development of the region, the legal framework governing water issues in Palestine has changed frequently during the last hundred years and still awaits final agreement in connection with the Israeli-Palestinian peace negotiations. Under Ottoman rule, Shari'a Law was the legal norm and provided in principle that the water was God's property and therefore not owned by any person. The British mandate Law in Palestine (1922-1948) and Jordanian legislation (1948-1967) retained Shari'a Law and introduced additional laws concerning water rights and management (Hotzl et al. 2009).

The 1967 Israeli occupation of the West Bank had significant implications for Palestinian water resources and their access and distribution. Under three military orders, Israel declared all water resources and water usage in the region as controlled by the military governor. These regulations are in force to the present day. As a transboundary resource, control over water has significant legal and political implications. Yet while key water resources are shared between Israel and the occupied Palestine territory (as well as regionally by Syria, Jordan and Lebanon), its access and distribution are dependent on a political process marred by asymmetries of power (Selby 2003; Zeitoun 2009).

In July 1967, shortly after Israel occupied the West Bank, Yigal Allon, a leading force in the Israeli Labor Party and minister of labor at the time, submitted a plan to the government; under the plan, which was never officially adopted by any government, the Jordan River marks the strategic border of the State of Israel and serves as a buffer zone between Israel and the 'Eastern Front', referring to a potential Iraqi-Jordanian-Syrian military coalition. The plan also called for Israel to annex a strip up to 15 kilometres wide along the Jordan Rift Valley and Judean Desert, in which a relatively small number of Palestinians lived, and to leave a land corridor in the Jericho area that would link Jordan and Palestinian population centres in the West Bank. The settlements in the area were to be 'permanent advance-position lookouts that would avoid having to call up military forces and could not only alert the military to a sudden attack by the enemy, but also attempt to halt, or at least delay, the enemy's advance until military forces could control the situation' (B'Tselem 2010). From 1967 to 1977, the government initiated the establishment of 19 settlements in the Jordan Rift Valley and northern Dead Sea area. In September 1977, following the rise of the Likud to power, Ariel Sharon, then minister of agriculture and head of the Ministerial Committee for Settlement, presented a plan that referred to the Jordan Rift Valley as 'the eastern security zone' and proposed expanding the chain of settlements in the area. From 1978-1992, under Likud-dominated governments, 11 more settlements were built.

With the Oslo Agreement (1992) and the signing of the Declaration of Principles, Israelis and Palestinians agreed on the equitable utilization of water resources and their joint management. In the Oslo II Agreement (1995) there was also a joint understanding on Palestinian water entitlements and the operation of a joint water commission. However, the translation of these principles into actual shares still awaits successful peace negotiations. The Oslo Accords divided control over the shared surface and

groundwater sources roughly 90%-10% in Israel's favour. Israel uses approximately 85% of groundwater resources originating in the West Bank and Gaza, leaving about 15% of available water for Palestinian use. Following the signing of the Oslo Accords all issues relating to Palestinian water rights are subject to the outcome of Final Status Negotiations.

The so-called interim period has effectively restricted the development of additional water sources and made them contingent upon the approval of the Israeli government. Thus despite the fact that Oslo II clearly asserts Palestinian water rights within the political boundaries of the West Bank and Gaza Strip, (albeit to be resolved in the context of a Final Status Agreement) the inability to ensure a just solution in line with international law has allowed Israel to protract the interim period and continue its exploitation of Palestinian water resources (Ma'an 2007).

Following the start of the Oslo Process in 1993, Israel's government, headed by the Labor Party, undertook not to establish new settlements and not to expand existing settlements. However, it did not consider the undertaking to apply to the Jordan Rift Valley. In his speech to the Knesset on approval of the Israeli-Palestinian Interim Agreement (Oslo II), Prime Minister Rabin explained clearly that 'the security border to protect the State of Israel will be set in the Jordan Rift Valley, in the broadest meaning of this term'.

The present government, headed by Binyamin Netanyahu, continues this policy, opposing any withdrawal from the Jordan Rift Valley. In a speech to the Knesset, Netanyahu quoted Rabin, saying that Israel's security border will be set in the Jordan Rift Valley, and during a visit in the Jordan Rift Valley he declared that the army 'must remain along the Jordan River in any future agreement' (B'Tselem 2010).

Consequently, Jordan Rift Valley settlements have grown at a steady rate aided by governmental aid that expanded important settlement infrastructure and attracted individual settlers. In 1993, the implementation of the Oslo Accords allowed Israel to strengthen its means of military control in the region; the Oslo Accords designated 95% of the Jordan Rift Valley as Area C, legitimizing full Israeli military and civil control for the inhabitants of the region (Ma'an 2012). The settlers in the area, like many Israelis, do not consider the Jordan Rift Valley and the northern Dead Sea occupied territory, but as part of the sovereign State of Israel.

## Geopolitical Context

The first civilian settlements in the West Bank were built in the Jordan Rift Valley (Ma'an 2012); the first colonization wave hit the Jordan Rift Valley in 1968 when Israel built three settlements: Mehola in the north, Argaman in the centre and Kalia in the south. Currently there are 36 settlements in the Jordan Rift Valley.

In addition to the highly visible presence of the settlements and settlers in the Jordan Rift Valley, the Israeli occupation imposes a wide range of restrictive measures on local inhabitants which impacts on every aspect of their daily life, and which constitute breaches of international humanitarian law, international human rights law, and the law of self-determination. These include land confiscations and closures, property demolitions, restrictions on movements of people and goods (including through checkpoints and curfews), diversion of water resources, restrictions on the maintenance and development of Palestinian water infrastructure, exploitation of the tourism and minerals sectors, restrictions on building, expanding or improving structures, restricted access to utilities and basic services, control of inhabitants' residential status, and, since 2000, an increased Israeli military presence.

Since 1967 Israel has sought to attract settlers to the Jordan Rift Valley, although recent efforts were boosted after implementing the unilateral evacuation plan from Gaza. After evacuating the settlements in Gaza in 2005, Israel took measures to resettle the people in the Jordan Rift Valley (Ma'an 2007). Israel has expanded available grants to facilitate further settlement activity in the Jordan Rift Valley, and settlers in this area enjoy high quality, free or subsidised public services. As a result of this policy, thousands of Palestinian families, particularly in the northern part of the Valley, have been issued orders to evacuate their agricultural land and grazing fields.

Israel's justification for occupying the Jordan Rift Valley has always been security purposes. Thus, consecutive Israeli governments have implemented plans seeking complete control of the area.

### Taking Control of Land

Israel has used various means to take control of most of the land in the area (B'Tselem 2011), including:

- Settlements: thousands of dunums were taken from Palestinian refugees and used to build the first settlements there, beginning in 1968 and extending throughout the 1970s.
- State land: by legal manipulation, Israel has enlarged the inventory of 'state land' in the area, such that 53.4 per cent of the area, four times greater than pre-1967, is now deemed state land.
- Military firing zones: Israel has declared 45.7 per cent of the area military firing zones, although they are situated next to main traffic arteries, alongside settlements' built-up areas and farmland, or include land of settlements that is under cultivation.
- Nature reserves: Israel has closed some 20 per cent of the land by declaring nature reserves, although only a small section of them has been developed and made suitable for visitors. Two-thirds of the nature reserves areas are also areas military firing zones.
- Minefields: Israel has seized lands in the northern Jordan Rift Valley for the Separation Barrier and has placed 64 minefields near the route of the Jordan River. The army itself contends the landmines are no longer required for security purposes.
- Tourist sites: Israel has taken control of most of the prominent tourist sites in the area – the northern shore of the Dead Sea, Wadi Qelt, the Qumran caves, the springs of the 'Ein Fashkha reserve, and the Qasr Alyahud site.

With over 81% of the area classified as Area C (under full Israeli control), residents of the Jordan Rift Valley face difficult living conditions: limited access to water resources; movement restrictions (residence, farming and grazing activities); limits in the expansion of the agricultural sector; policies that undermine agricultural activity; confiscation of fertile land and control of Palestinian access to local and Arab markets (JICA 2008).

Ma'an (2011) identifies the following agricultural barriers imposed by Israel on Palestinians in the Jordan Rift Valley:

- Complete dependence on Israeli production components, such as fertilizers, seeds and irrigation networks; it is difficult to find Palestinian alternatives to Israeli goods, meaning that Israeli companies control price and quality;
- Continued confiscation of agricultural land to complete the eastern segregation zone and expand settlements and closed military zones;
- Dumping the Palestinian market with Israeli goods produced in settlements, especially during peak production, in order to eliminate Palestinian products that may supply the local markets;
- Demolition and destruction of infrastructure, such as curettage of agricultural lands, demolition of stone terraces and irrigation networks;

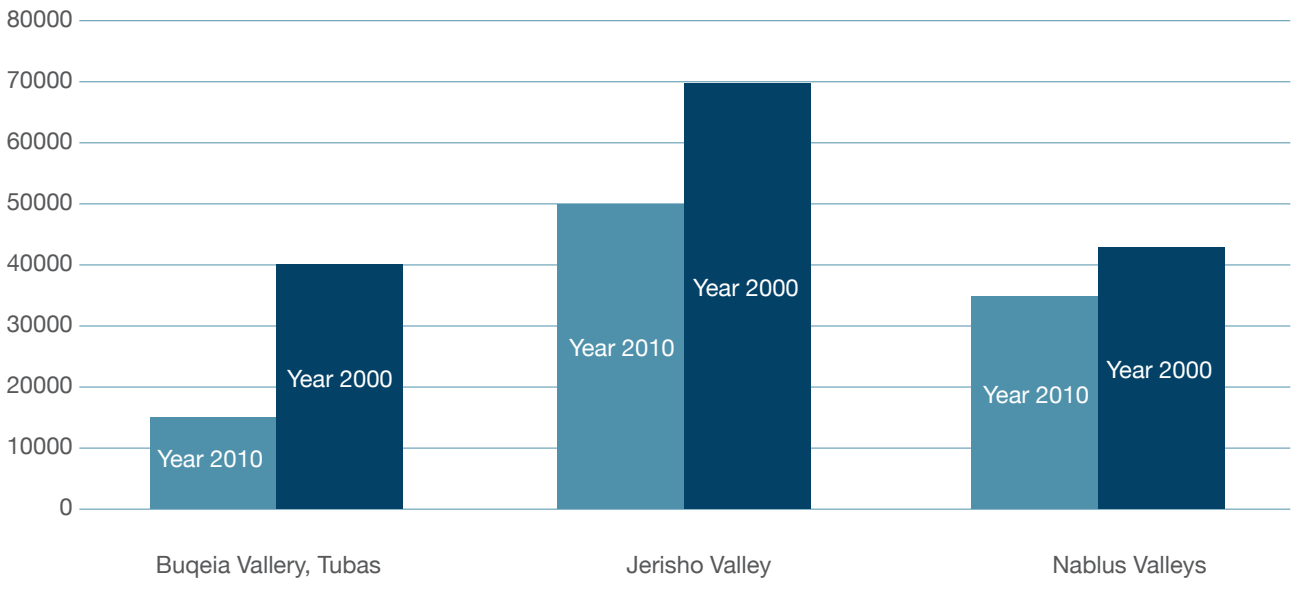
- Prevention of building new wells, reconditioning existing wells and digging deep wells near springs and other Palestinian wells, which prevents water from running to Palestinian fields;
- Erosion of the livestock sector by imposing high fines on shepherds who let their sheep cross an Israeli zone from which Palestinians are forbidden
- Prevention of land owners, who do not have a Jordan Rift Valley residential address on their ID, from reaching or cultivating their lands;
- Closure of Arab, Israeli and regional markets to Palestinian farmers.

Also, the confiscation of Palestinian lands has greatly contributed to the decline in natural grazing areas in the Jordan Rift Valley.

The Israeli Civil Administration has closed an area of 240,000 dunums of natural grazing in the Jordan Rift Valley under the pretext of wildlife protection, although this 'closed area' is used for military training by the Israeli army, resulting, in the burning of thousands of pastoral dunums per year. Moreover, Israeli settlers have directly targeted Palestinian citizens in the Jordan Rift Valley by a series of measures, notably limiting the grazing areas, burning fields and attacking shepherds and their communities with the declared aim of forcing them to leave. These Israeli practices have led to a decline of grazing land in the Jordan Rift Valley. And as farmers have increasingly used fodder as a substitute for natural grazing areas, production costs have increased and animal husbandry has declined (Ma'an 2011). Figure 4.4 illustrates the decline in Palestinian livestock numbers.

**Figure 4.4: The Declining Number of Animal Livestock in the Jordan Rift Valley (2000-2010)**

*Source: Ma'an 2011*



### Taking Control of Water Resources

The Jordan Rift Valley is situated over the Eastern Water Basin. However, Palestinians in the area suffer from the lack of access to water due to Israeli restrictions and copious usage. They are only permitted to use 40% of the water in this basin or approximately 58 million $m^3$ of water per year (Ma'an 2007).

Most Israeli water drillings in the West Bank – 28 of the 42 drillings – are located in the Jordan Rift Valley. These drillings provide Israel with some 32 million $m^3$ a year, most of which is allocated to the settlements. The annual allocation of water to the area's 9,400 settlers from the drillings, the Jordan River, treated wastewater, and artificial water reservoirs is 45 million $m^3$. The water allocation to the settlements is almost one-third the quantity of water that is accessible to the 2.5 million Palestinians living in the West Bank (B'Tselem 2011).

Israel's control of the water sources in the area has caused some Palestinian wells to dry up and led to a drop in the quantity of water that can be produced from other wells and from springs. In comparison, in 2008, Palestinians pumped 31 million $m^3$, which is 44 per cent less than Palestinians produced in the area prior to the Israeli-Palestinian Interim Agreement of 1995. Due to the water shortage, Palestinians have neglected farmland and switched to less profitable crops. In the Jericho governorate, the amount of land used for agriculture is the lowest among the Palestinian governorates in the West Bank; 4.7 per cent compared to an average of 25 per cent in the other governorates.

Israel's control of most of the land area also prevents equal distribution of water resources to the Palestinian communities in the area; it also prevents the movement of water to Palestinian communities outside the area. Water consumption in Bedouin communities is equivalent to the quantity that the UN has set as the minimal quantity needed to survive in humanitarian-disaster areas. Over the last four decades, Israel has isolated 162 agricultural wells in the Jordan Rift Valley, prohibiting Palestinians from using them.

Furthermore, due to various Israeli restrictions, settlers in the Jordan Rift Valley, who cultivate around 27,000 dunums (6,672 acres) of land, consume about 41 mcm of water per year. They mainly extract Palestinian water sources, in addition to restricting its access to the Palestinians, to cultivate their lands. In contrast, Palestinians cultivate about 53,000 dunums of the valley's land, consuming 37 mcm of water per year. Overall, settlers consume about six times more water than Palestinians (Ma'an 2007). Israel also fully controls the Dead Sea and denies Palestinian rights to access its water, minerals and shores.

### Restrictions on Movement

A 2009 Israeli framework for easing movement restrictions in the West Bank was not applied to the Jordan Rift Valley, despite the security calm in the area. Israel still operates four checkpoints in the Jordan Rift Valley – Tayasir, Hamra, Ma'ale Efrayim, and Yitav. At these checkpoints, only Palestinian-owned vehicles that Israel recognizes as belonging to residents of the area are allowed to pass (B'Tselem 2011). These restrictions on movement seriously impair Palestinian life, since most of the educational facilities and medical clinics that are supposed to serve the local residents are situated outside the area. The restrictions also prevent landowners, whose IDs do not show a Jordan Rift Valley residential address, from reaching their lands, resulting in loss of sources of income and making it easier for Israel to confiscate their land under Israel's 'absentee' property law (Ma'an 2007).

By surrounding the Jordan Rift Valley with checkpoints, closures and roadblocks and confiscating more land for settlements and military bases, Israel is securing segregation as a fact on the ground.

### Restrictions on Building

Israel's planning policy in the Jordan Rift Valley makes it practically impossible for Palestinians to build and develop their communities. The Civil Administration has prepared plans for only a tiny fraction of the Palestinian communities. Furthermore, these plans are nothing more than demarcation plans, which do not allocate land for new construction and development. For example, the plan for al-Jiftlik, the largest community in Area C (the area that is under complete Israeli control), left 40 per cent of the built-up area of the village outside its borders; as a result, the houses of many families are in danger of demolition. The plan for al-Jiftlik is smaller in land area than the plan issued for the Maskiyyot settlement, although al-Jiftlik has 26 times as many residents (B'Tselem 2011).

Although Palestinians can still cultivate any land remaining after Israeli confiscation and colonisation, Israel prohibits Palestinians from constructing any infrastructure or other development projects, such as reclaiming of agricultural land, opening agricultural roads or extending irrigation networks. Moreover, Israel continues to confiscate land, demolish homes and prevent rehabilitation of existing houses and roads of the Palestinians, but maintains plans for settlement expansion and infrastructure development for Israeli settlers in the Jordan Rift Valley (Ma'an 2007).

### Demolitions and Displacements

The Palestinian communities located in the Jordan Rift Valley have been facing significant threats of a possible wide-scale displacement as the Israeli Occupation Forces issued around 350 evacuation and demolition orders, from January 2010 up until June 2011 (Ma'an 2011). It is estimated that 11 Palestinian communities have been targeted by consistent Israeli violations, as 242 demolitions, eviction and removal orders have been issued. Five of these communities are located in the northern part of the Jordan Rift Valley, in the Tubas governorate, while six are in the southern and middle areas of the West Bank in the Jericho governorate (Ma'an 2011).

## Socio-economic Indicators

### Poverty & Unemployment

The wide range of restrictions placed on them by the occupation mean that the majority of Palestinians living in the Jordan Rift Valley live below the poverty line. In 2011 poverty levels were 60% in the study area, compared with 46% in the rest of the West Bank, and 70% in Gaza (Ma'an 2011). In 2006 unemployment rates reached 21% in Jericho and Tubas districts, with 20.5% being Palestinian Authority employees who were not receiving their salaries (Jordan Valley Solidarity, 2010). Unemployment rates in these governorates have remained higher than those for the West Bank as a whole: in 2013 unemployment rates were 21.2% in the Jericho Governorate and 22.5% in the Tuba Governorate, compared to 20.3% average for the West Bank (Palestinian Central Bureau of Statistics, 2013: 19).

### Infrastructure

There is a lack of basic services available to the Jordan Rift Valley, especially in Area C. The occupation has the effect of denying to the local communities adequate electricity, health, education, sewage, water and public transportation services. Health services in particular do not meet the requirements of the population, especially in emergency situations, where poorly equipped clinics with limited hours of operation are frequently required to transfer patients to city hospitals, often subject to delays at checkpoints with potentially detrimental effects on patients' health.

Similarly, the prohibition on improving buildings means that no new schools can be built, and existing ones cannot be improved to meet the socio-economic needs of a growing population. In 2010 13,000 Palestinian students in the Jordan Rift Valley returned to schools in tents, caravans or tin shacks (Ma'an 2011).

# The Occupied Golan Heights: Study Area Profile

Muna Dajani (lead author) and Ziad Mimi

## Area and Population

Historically, the Golan Heights are located in Syria, bordering with Lebanon, Jordan and Palestine. For that reason the Golan Heights have been a transit zone between these countries throughout history. Since the establishment of the Israeli state, the Golan Heights are in the south-west of Syria, bordered by Lebanon in the north, in the west by the Galilee region of Israel and the Jordan Valley, and in the south by Jordan and the Yarmouk valley. In the east are the provinces of Damascus and Dara'a, the plains of Horan and the foothills of Mount Hermon.

The area of the Syrian Golan is 1860 km$^2$. During the June 1967 war, Israel occupied about 1250 km$^2$ (Brik 2009). During the October War of 1973, Syria was able to take back 50 km$^2$, and the rest remained under occupation. The Syrian population of the Golan Heights has dramatically changed due to the Israeli occupation of 1967, as shown in Table 5.1. With a historically prosperous population of 153,000 inhabitants in 1967, this population has diminished substantially due to ethnic cleansing and forced displacement and merely 7000 residents remained in the Golan after the war. Today, Syrian residents compromise 50% of the inhabitants of the occupied Golan Heights (oGH) with 20,000 residents, while Jewish Israeli settlers comprise the other 50%. This demographic change has transformed the indigenous inhabitants of the Golan into residents inside Israel with temporary status and no citizenship (Jawlan 2012).

**Table 5.1: Population in Occupied Golan Heights**

*Source: Jawlan 2012*

| Year | Population |
|---|---|
| 1949 | 62,293 |
| 1967 | 153,000 |
| After 1967 | 7,000 |
| Today | |

## Topography and Land Use

The Golan Heights is a sloping plateau, ascending from 300 metres on its west end to 1,000 meters on its east end, covering a total area of 1,860 km$^2$ (Brik 2009). The Jordan River and the Lake Tiberias mark the western border, the Yarmouk River demarcates its southern perimeter and the Hermon Mountain marks the northern boundary of the Heights (Inbar 2011). The Golan Heights elevation ranges from 2,814 metres at the Hermon Mountain to below sea level at Lake Tiberias and the Yarmouk River, with an average elevation of 1,000 metres (CIA Factbook 2012). The Golan Heights area is covered by basalt, originating from volcanic eruptions, and serving as local aquifers (Dafny et al. 2003). The southern Golan, where the first illegal Israeli settlement was built, is the richest area in terms of soil quality and water availability and has the most productive agricultural land (Brik 2009). In the north of the oGH, the less fertile scrub landscape is mainly used for grazing: Israeli beef cattle ranches have been operating here for over 30 years.

## Agriculture in the Golan

Following the occupation in 1967 and the declaration by the state of Israel that 98% of the oGH lands are closed military zones, the agricultural practices conducted by the Syrian residents in the area were transformed from extensive to intensive (Al Marsad 2009). This has shifted the agricultural practices of the Syrian inhabitants to production of apples. Historically, the Syrian population of the Golan used to depend on rain-fed agriculture due to the vast amounts of land available for that and the lack of strict planning rules in their area and rearing of livestock in rocky and mountainous terrain (Mara'i & Halabi 1992). Following the occupation and annexation, a huge shift in the type of products grown (from wheat and barley) and from rain-fed to irrigated crops. This was highly influenced by the Israeli occupation and confiscation of land, the introduction of agricultural technologies and the limitation on water utilisation (Personal Interview, August 2012).

### Agricultural Committees

The total cultivated land of the Golan Heights by the Syrian population is around 20,000 dunums, 18,000 of which are planted with apples. This cultivated land represents only 30% of the total area of Syrian land owned by people living in the oGH. Before the occupation, elected collective communities, in coordination with the Syrian government, used to coordinate the agricultural activities in the Golan Heights. After the occupation, these committees were dissolved, leaving the Syrian residents totally disconnected to Syrian government assistance and the Syrian market (Al Marsad 2009). This has led to an emerging dependence on Israeli products, especially dairy. During the 1970s, the Syrian population started organizing around the issue of water rights and the right to be allocated water for agriculture from the local water sources, especially Ram Lake. Therefore, agricultural land in the oGH belonging to the Syrian villages was divided into areas or plots. Each area established a committee for the farmers responsible for management of water purchase issues from Mekorot (the national water company of Israel) and other land management processes. Today, 20 agricultural committees exist in the five villages of the Golan (Mara'i 2012).

Since 2007, agricultural centres were established which collectively manage committees that come together. These centres were established to enhance transparency, facilitate water payment, avoid financial disputes and provide a legal and managerial platform to better manage the committees work. Today, one centre in Majdal Shams serves 3,500 farmers from 6 committees. Each farmer is thus obliged to pay his/her water bill through the centre, which is processed after receiving the water meter readings from the water regulator of each shared plot. The centre also facilitates and provides the committees with opportunities to benefit from governmental subsidies, grants and reclamation of water pumping fees, therefore re-claiming the legal entitlements of the farmers to these subsidies. The reclamation of water pumping fees was a precedent by the centre, taking into consideration that the pumping expenses had always been incurred by the farmers with no compensation from Mekorot.

Today, the Syrian farmers of the oGH are paying a high rate of 3.90 – 4.20 NIS per cubic metre while the settlements are acquiring water with a lower rate of 0.90 NIS per cubic metre due to incentives and subsidies given to them by the Israeli government (Mara'i 2012).

### Settler Land Use and Agriculture

Today, the Israeli settlements use 90,000 dunums for agricultural purposes. According to the latest seasonal study on the agricultural products of 2012, 70% of the Gross National Product in the Golan Regional Council comes from agriculture, livestock, dairy products and flower growing (Shishibagolan 2012). The settlements in the oGH today produce mainly beef, cherry, apples, wine and mineral water. In addition, many of these products are exported to many countries around the world, including the USA and Canada (Al Marsad 2009).

## Climate

The Golan Heights climate is generally described as Mediterranean with dry summers and cold wet winters, with temperatures ranging from a minimum average of 4.4 to a maximum average of 36 degrees Celsius (Central Bureau of Statistics of Israel 2012: 68). In the Golan Heights, the annual precipitation varies from 1,200 mm in the northeast to less than 500 mm in the south (UNESCO 2009). Annually, the GH receives 250 million cubic metres (MCM) of rain (Brik 2009).

## Water Resources

The occupied sector of the Golan Heights provides a substantial portion of the water in the Jordan River watershed, which in turn provides a portion of Israel's water supply (Gvirtzman 2002). The Golan Heights are the source of about one third of Israel's water supply for drinking, irrigation and other uses. This is one of the main reasons for the continued Israeli refusal to implement the provisions of UN Security Council Resolution 242 and withdraw to beyond the borders of 4th June 1967 (Dajani 2011). The sources of the Jordan River are the Dan (270 million $m^3$/yr), the Banias (120 million $m^3$/yr) and the Hasbani (120 million $m^3$/yr) that flow at the foot of the Hermon Mountain (Zeitoun et al. 2012; Brik 2009). Since the occupation in 1967, Syria is not allowed to utilise the contribution the Banias springs make to the Jordan River. Today and since the occupation, Israel controls the three tributaries of the River Jordan and exercises full control of their waters (Zeitoun et al. 2012). The Israeli water company, Mekorot, is in charge of water management in the oGH and the basin as a whole.

Three tributaries of the Jordan River, the Dan, Hasbani, and Banias find their sources in this region and are crucial to agricultural development.

The inactive volcanic crater in the northern Golan is filled with water and forms Masada Lake (also known as Ram Lake). It has an area of 1 $km^2$. Lake Masada is a unique natural phenomenon in Syria and the Arab world, the lake's surface being 945 metres higher than sea level. Recently and due to pumping by Mekorot, Lake Ram is under the threat of drying up. Once 1000 m long and 600 m wide, this lake has provided water for agriculture, especially for apple orchards (Jawlan 2012).

## Water and Occupation

After the occupation, Israel intensified its settlement building in the south of the Golan Heights, known to be the most fertile part of the heights and the most productive zone agriculturally. Israel initially provided water resources for these agricultural settlements by pumping water from Lake Tiberias. With the high elevation difference and the costly process of pumping, the Israeli authorities begun a project of constructing artificial lakes to collect surface water from the North of the Golan and provide water resources to its agricultural settlements. Today, there are 18 artificial lakes built by Israel to capture the water of the many springs of the Golan through constructing multiple dams for storage and use in the illegal agricultural settlements in the south of the Golan. The total yield of these lakes is around 30 MCM/year (Mara'i 2012). 'Mey Golan [Golan Water]' is a company that operates and manages all water reservoirs in the occupied Golan Heights, from the north at Hermon Mountain to the south in Hamat Gader. It provides water for 27 agricultural communities and aims to provide potable water and wastewater for agriculture and domestic use (Golan Residents Committee 2013).

In the 1970s, with the introduction of mechanisation into agricultural practices, the Syrian population of the Golan started investing more in harvesting rainwater and building large reservoirs for water storage.

This occurred until the 1970s, when Israel started to impose strict laws on water abstraction and confiscated all existing water reservoirs in an attempt to control the water used by the Syrian population. During the period when Israel annexed the Golan, the Syrian population continued the construction of 1000 cubic metre reservoirs to collect rain water and use it for agriculture. There were some cases of reservoirs demolitions but with no clear laws regarding rainwater collection at that time, 650 reservoirs remain in use. Today, five different permits are required from agencies and governmental offices to obtain a permit to construct and use such a reservoir. In addition, rain water harvesting is considered illegal in Israel and its occupied territories under the guise of it being state property (Mara'i 2012).

Today, the Syrian population in the oGH receives about 250 cubic metres of water per dunum of land while the Israeli settlers receive 750 cubic metres per dunum, limiting the Syrian land and crop development. Additionally, Syrian farmers are subjected to cuts in water supply in dry seasons to ensure that settlements receive their share without interruption (ILO 2012).

## Geopolitical Context

### Golan Heights before 1967

The Franco-British Boundary Agreement of 1920 started dividing the land previously governed by the Ottoman regime. According to this agreement, most of the Golan Heights was placed under the French mandate, including the Wazzani and Banias, highlighting the water borders which are still in negotiation and debate until today. In 1944, Syria became independent of the French colonial regime and the Golan Heights became part of the Quneitra governorate.

After the Israeli-Arab war of 1948, the 1949 armistice agreement signed between Israel and the neighbouring Arab countries (Syria, Lebanon, Egypt and Jordan) established demarcation lines between Israeli forces and the Arab forces. The armistice line of 1949 is where the Syrian army withdrew its forces in three areas to the west of the 1923 international line and west of the Jordan River as seen in Figure 5.1 (Hof 2009). There were numerous violations, from both sides, of the armistice agreement. In the demilitarised zone Israel unilaterally removed Arabs, replacing them with settlers, prompting exchanges of fire with the Syrians. Syria and Israel also clashed over Israeli water development works in the Huleh basin, which lies in the demilitarised zone (Daoudy 2008; Muslih 1993).

Through 1965–1966, Israel and Syria exchanged fire over an Arab plan to divert the Jordan River headwaters, presumably to block Israeli construction of a national water carrier, an out-of basin diversion plan from the Sea of Galilee to areas of the coast and southern Israel (Wolf 1998). This attempt was averted by Israeli use of force, which precipitated the outbreak of the 1967 War (Inbar 2011).

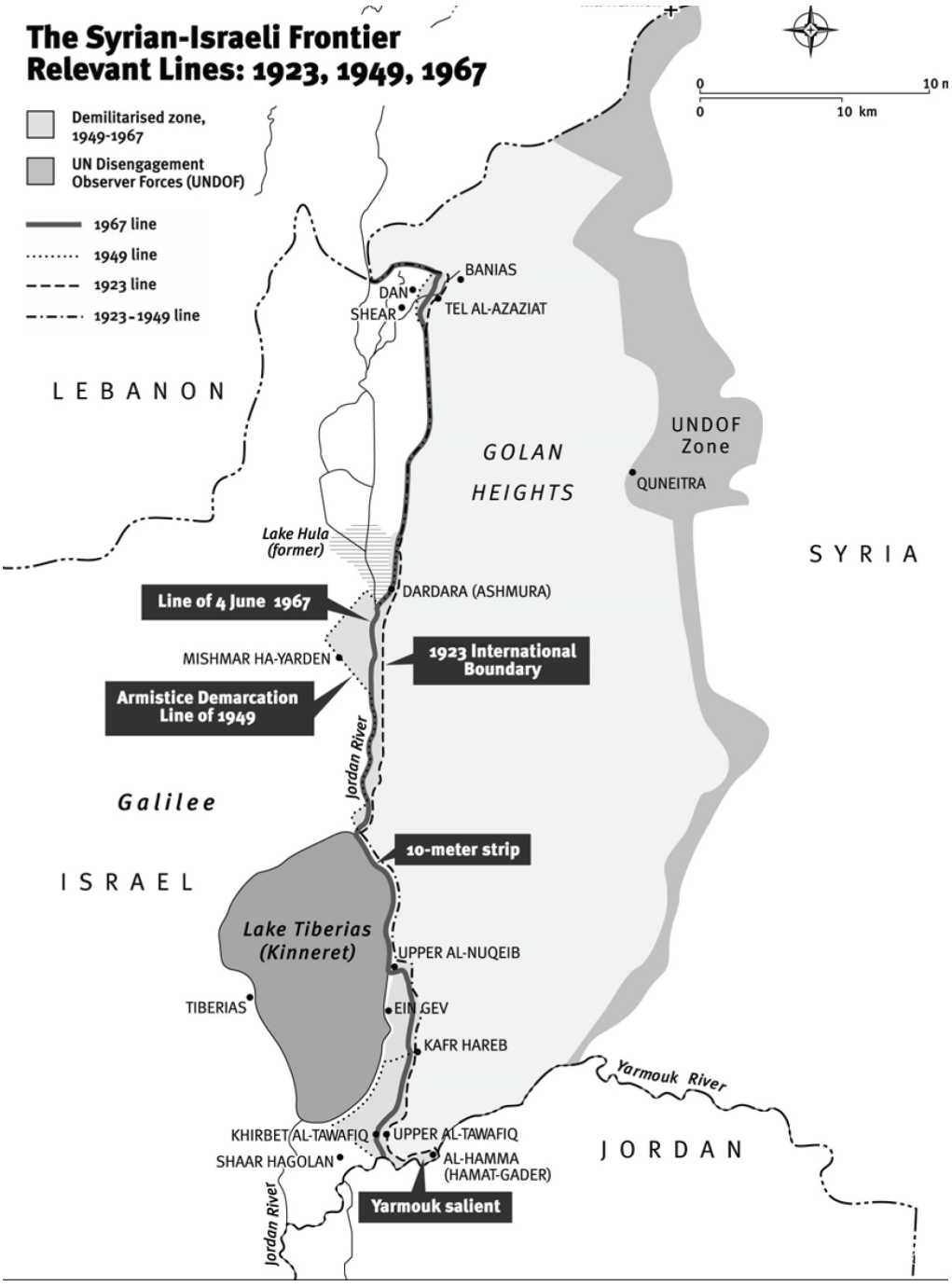
### Golan Heights after 1967: Occupation

Israel captured the Golan Heights in the 1967 war. In 1973, Syria managed to reclaim the capital city of the Golan, Quenitra, albeit heavily damaged. The armistice agreement was signed in 1974, where the United Nations Disengagement Force (UNDOF) was deployed on the ceasefire line. In 1981, Israel annexed the oGH, applying Israeli jurisdiction, administration and laws: the Golan Heights Law was was ratified by the Knesset on December 14, 1981. Under UN Security Council Resolution 497/1981, the UN declared the annexation null and void.

The Golan Heights Law required Syrian residents of the oGH to change their citizenship to Israeli. This was widely refused by the residents, with 10% accepting Israeli citizenship, and the oGH saw a residents' strike and non-violent actions opposing the

**Figure 5.1: The Golan Heights**

*Source: Hof 2009*



law (Nashashibi 2007).

Before 1967, the Golan Heights had a prosperous and thriving population living in 164 villages and 146 farms (Davis 1983). After 1967, only six Arab villages remained in the oGH; Majdal Shams, Masada, Buqata, Ein Qenia, Ghagar and Sahita. Residents of Sahita were displaced to the village of Masada in 1971-1972, when Israel destroyed the village and turned it into military camp along the ceasefire line. The Israeli occupation has destroyed 131 villages, 112 farms and two cities. The proportion of total demolition, displacement and genocide in the oGH is about 98% of the total area; only five villages in the northern Golan remain today. Today, there are 41 Jewish-only settlements in the oGH, with a population of around 20,000 inhabitants (CIA Factbook 2012). Today only 5% of the Golan Heights is under the control of its indigenous population.

## Socio-Economic Indicators

The Golan Heights is known for its fertile land, ample water resources and its ideal location for tourism and for agricultural development. Therefore, the Israeli settlements that exist today in the oGH depend heavily on agriculture, industry and tourism to maintain their economic security. With the Israeli occupation maintaining a strong grip on natural resources, mainly land and water, it has provided subsidies and economic incentives for settlers' investment in farms and agricultural businesses. However, Israel's economic practices towards the Arab population have been far from supportive. Land confiscation, water control and creation of competitive settler goods have all played a role in weakening the economic status of the Syrian inhabitants of the Golan.

### Poverty and Uncertainty

The economic situation in the oGH is deteriorating due to the Israeli occupation; namely, the lack of job opportunities and the high competition with settlers practising agriculture, which is still the main source of income for the Syrian population of the Golan (ILO 2012). Restricted access to resources and imposed taxation (without representation) exemplify this disparity (Nashashibi, 2007).

In terms of employment, the Syrian population is experiencing discrimination and limited employment opportunities in Israel. According to the International Labour Organisation, Israeli policies and laws limiting access to resource have hindered any substantial growth of the Arab villages in the oGH (ILO 2012). Nevertheless, the communities in the villages have established and maintained a strong social security net that allowed them to develop the area collectively and strengthen their resistance against the occupation (Al Marsad 2009)

### Tourism

Tourism in the Golan Heights draws around 3 million visitors a year, according to the Israeli Ministry of Tourism. The first Israeli ski resort is on Mount Hermon in addition to many nature hiking trails, nature reserves, wineries in settlements and archaeological sites. According to Golan for Development (GfD), the Mount Hermon ski resort is managed by the settlement of Navi Ativ, where all profit goes to the settlement with an average visitor number of 300,000 people in the winter season.

# Southern Lebanon: Hasbani Watershed Study Area Profile

Mohammed Khawlie (lead author)

## Area and Population

The Hasbani River, the result of the merging the Hasbani and Wazzani tributaries plus others, all issuing from Lebanon, constitutes a major watershed in Southern Lebanon, and is one of the main contributors to the Jordan River at its upper reaches: The Hasbani-Banias-Dan tributaries (Zeitoun et al. 2012) (see Figure 6.1). At the upper reaches, Jordan River water sources also come from Syria and Israel, making its waters shared by five political entities: Lebanon, Syria, Jordan, Israel and the occupied Palestinian territory.

The Hasbani Basin covers about a 670 km$^2$ watershed in Southern Lebanon (bordered by Syria to the east and occupied Palestine to the south), making about 3.62% of all Jordan River Basin, with a usual annual average flow of about 160 million cubic metres (mcm). And yet, in spite of the Johnston Plan of 1953 allocating to Lebanon, as a riparian country, only 35 mcm annually, Israel does not allow Lebanon to use this share. Al-Shaikh Mountain (Haramoun), occupying the whole eastern flank of the Basin from north to south, is the major source of water. This comes from its high peaks, up to 2814m, with snow cover for more than 4 months of the year, plus the many water springs issuing from its precipices and slopes, including the Hasbaya and Wazzani springs. The large, elevated and rugged mountain mass, with natural diversity and very mild weather, has long attracted settlement with the current population estimated be around 170,000 residents (MoSA 1998).

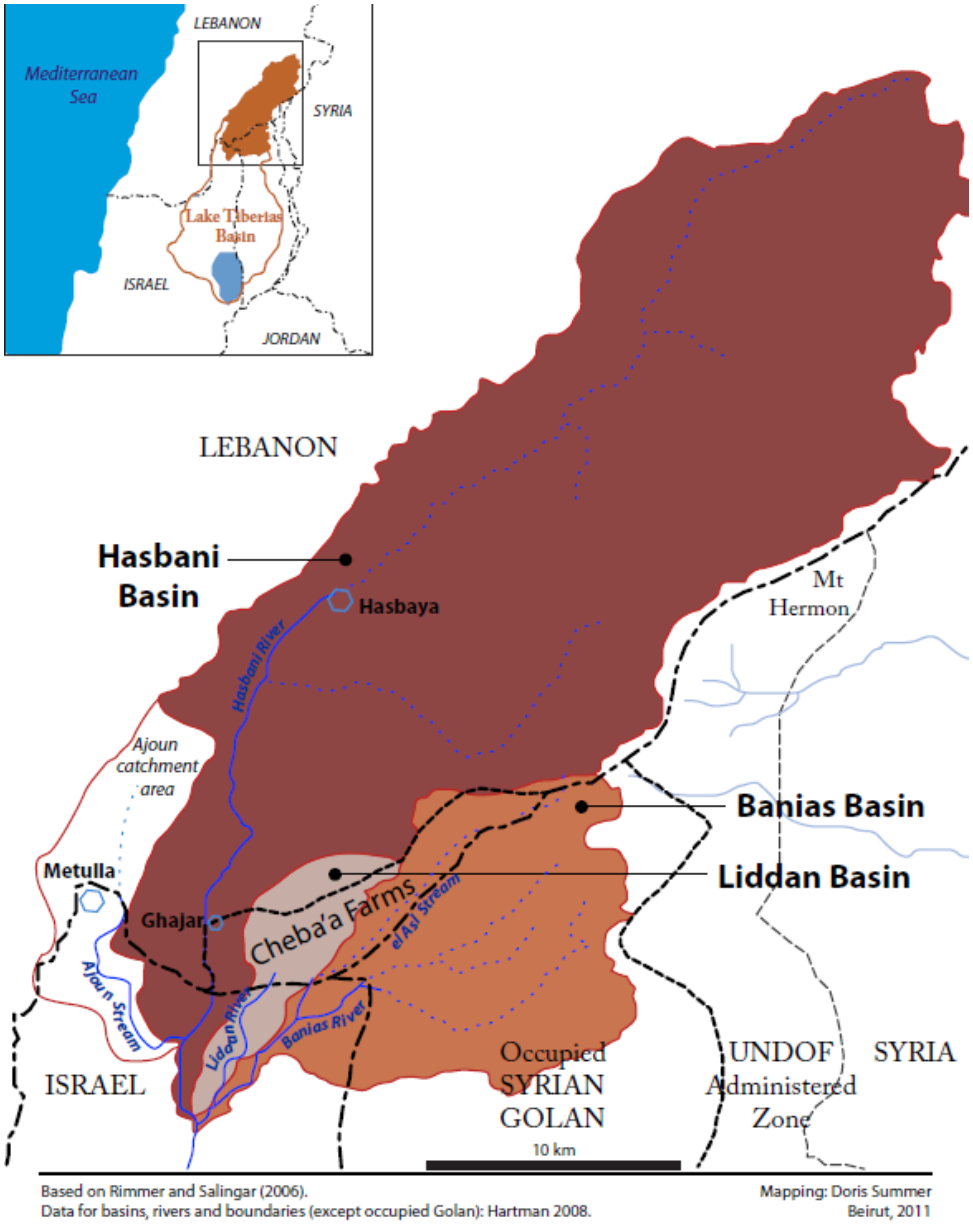
The area has enjoyed a strategic position since history as lying on the cross roads between Lebanon-Syria-Palestine, serving multi-purpose goals in social interaction, agricultural exchange, commercial dealings and tourism, facilitated by a fairly dense network of roads.

The different lithologies, reflecting the geological history plus surface cover, soil types and interaction with the climate elements and hydrology, have allowed a variety of processes for human benefit, be it in agriculture (most prominent), in industry, in services and human settlements.

Hasbaya is the major urban centre, located about 750m above sea level and 114km south-east from the capital Beirut. It services a large congregation of towns and villages, 161 in total, spreading over 3 Cazas (administrative districts). The area hosts a number of archaeological and historical sites, including Al-Chehab Palace which used to be a Crusader's castle, the Antara palace at mount Al-Shaikh, Al-Khalil Ibrahim mazar, and a lot of widely dispersed Roman ruins, bridges, colonial castles, old churches, towers and Khans (Sharrouf 2012).

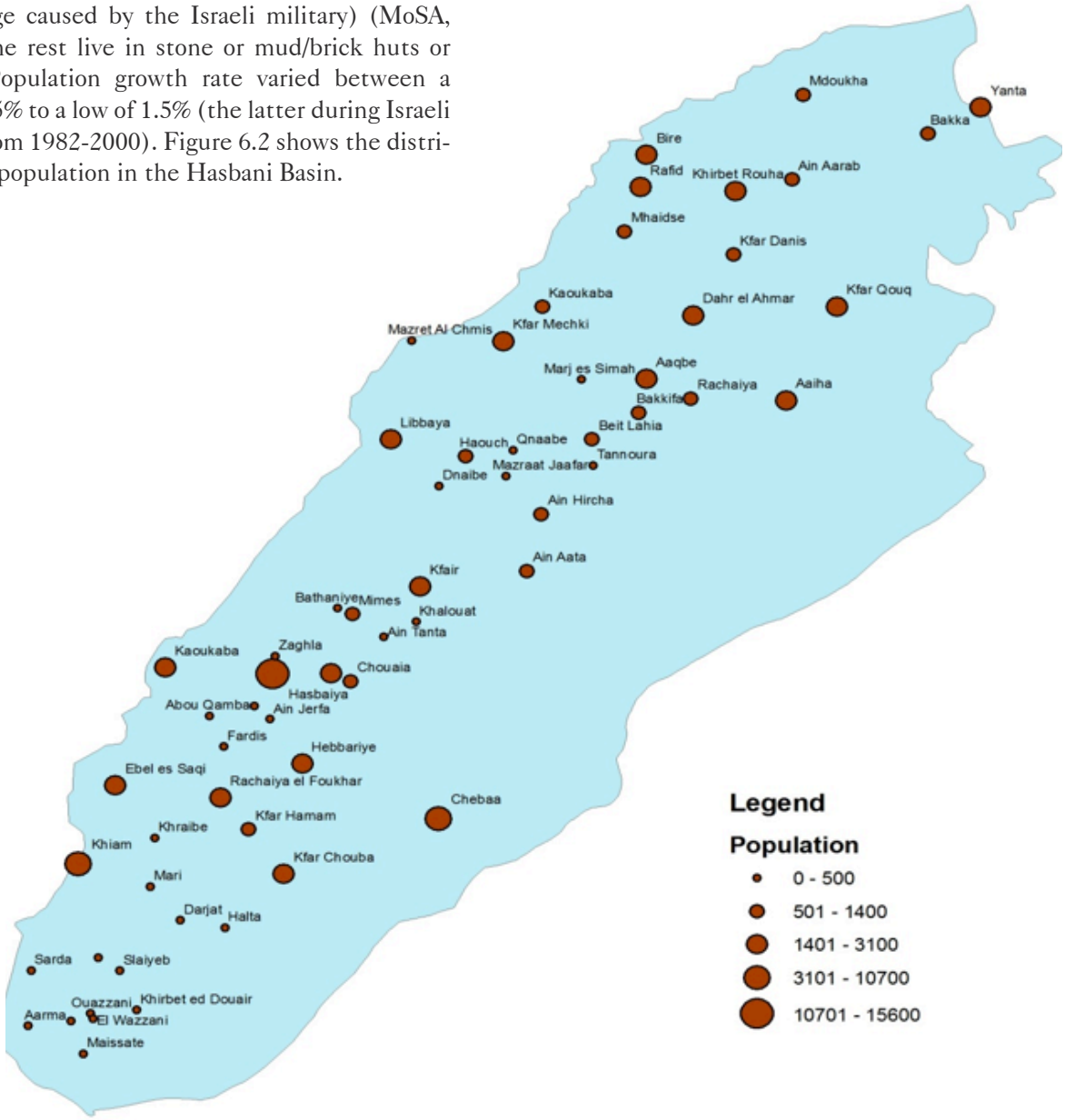
**Figure 6.1: The Jordan River Basin Showing Upper Reaches including the Hasbani River**

*Source: Zeitoun et al. 2013: 296*



The Hasbaya district comprises 4.2% of total Lebanese housing (compared to about 18% in Beirut), with an average of 5 people per residence, of whom about 70% live in relatively recent concrete structures from the last 30 years (including re-construction after damage caused by the Israeli military) (MoSA, 1998). The rest live in stone or mud/brick huts or houses. Population growth rate varied between a high of 2.5% to a low of 1.5% (the latter during Israeli control from 1982-2000). Figure 6.2 shows the distribution of population in the Hasbani Basin.

**Figure 6.2: Distribution of Population over Towns and Villages in the Hasbani Basin**



## Topography and Land-use

Figure 6.3 reveals the land forms and physiographic layout of the watershed. The land can be divided into four zones relating to its surficial processes: Elevated zone, containing most of Jabal Al-Shaikh and other mountains north-east and east; Sloping zone comprising the north-west, central and west; the Platform zone filling the south-west; and the basalt Plains towards the south. Physiographically, these same zones, consecutively, are occupied by the elevated Jurassic limestones and dolomites, highly dissected and karstic; followed by the mixed Cretaceous calcareous and clastic rocks with variable to moderate slopes, also highly dissected and karstic; then the plateau holds the Hasbani River with its mostly Paleogene marls on both banks of the Wadi with moderate dissection and clastics filling the highly weathered volcanic forms; and finally the Neogene mostly basaltic plain holding the Wazzani watershed, where the volcanic rocks spread widely as they become part of the Golan volcanic region.

**Figure 6.3: Physiography of the Hasbani Basin**

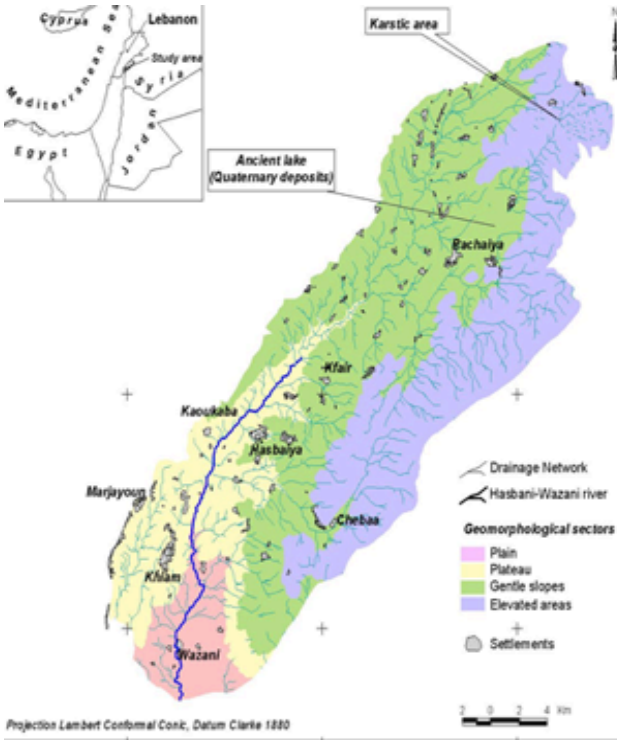



Figure 6.4 shows that the green cover is quite dense in the study area with all types of vegetation, although, due to the rugged rocks at higher elevations, 35% is barren. Especially notable are the olive groves, considered among the largest in the country, and due to the diversity in local weather, there is a variety of agro-products, i.e. fruits, vines, citrus and field crops, interspersed with forests and urban patches.

There have been major changes in land use over the past 40-50 years, ostensibly caused by chaotic urban expansion at the expense of agriculture, forestry and natural resources. Masri et al. (2002) revealed drastic reductions in Lebanon's agro-production between the 1970s and 2000, accentuated in southern Lebanon by weak Lebanese governmental authority in the face of the Israeli occupation and subsequent military incursions. Most recently, the 2006 summer war between Israel and Lebanon caused major economic losses to the Lebanese agricultural sector (Darwish et al. 2009). The claim that conflict-related, rather than climate-related, stresses have resulted in significant losses to agricultural production was tested by the project fieldwork surveys and focus group work.

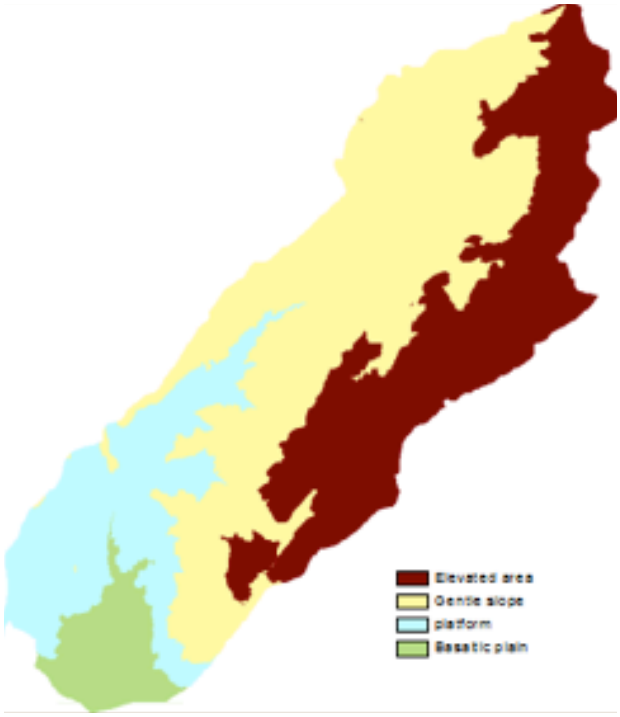
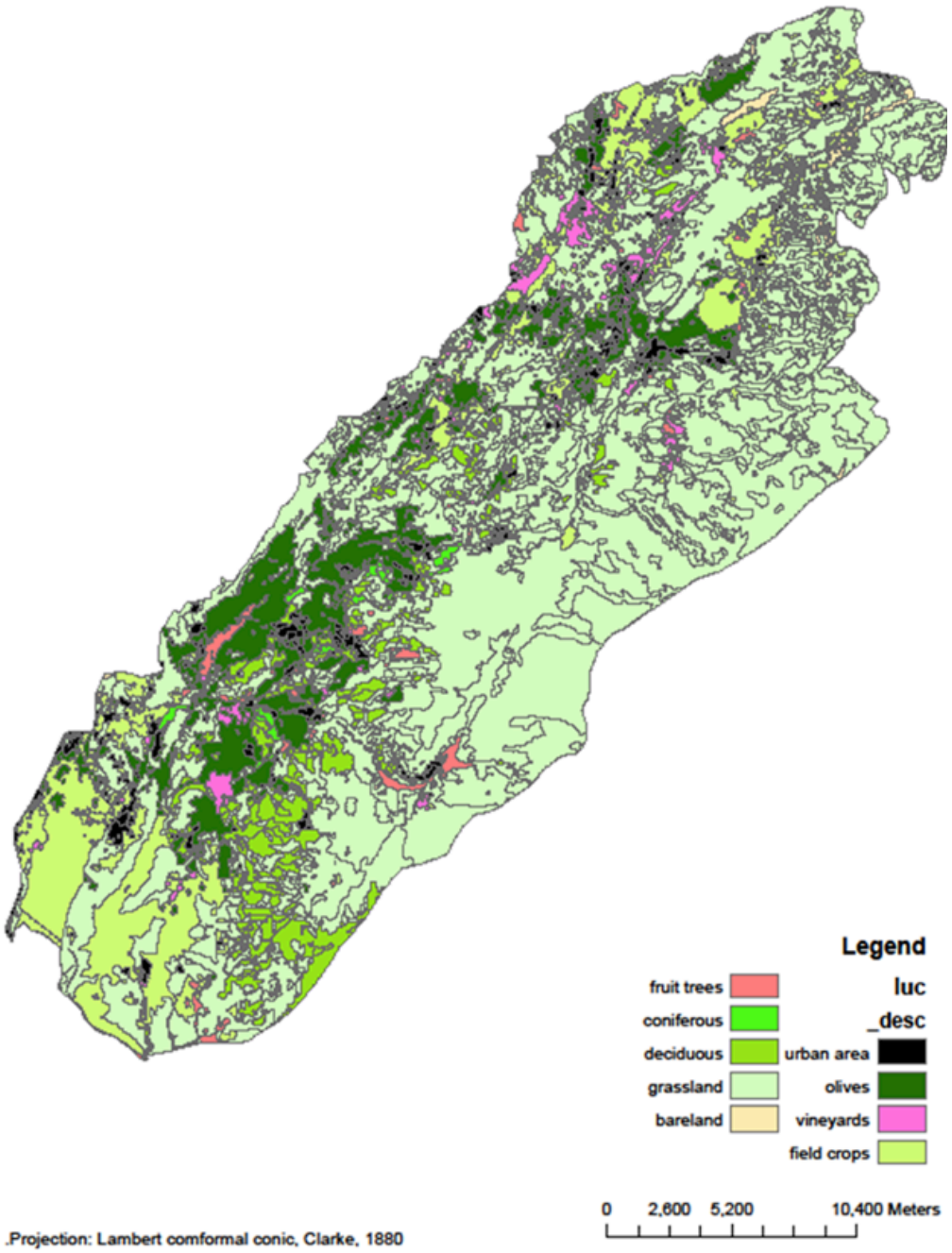


**Figure 6.4: Land Use/Land Cover Map of the Hasbani Watershed**



### Agriculture in the Hasbani Basin

In the Hasbani Basin up to 70% of the population works in agriculture, although there is high local variability. Thus in Hasbaya city, only about 10% work in agriculture, while 25% work in industry and most of the rest work in services: this is broadly representative of national employment in these sectors (Sharrouf 2012).

Less than 22% of the Hasbani Basin is arable, and up to 60% needs irrigation, with about 18% used for agriculture. Indeed, a recent land-cover survey (Merheb 2010) revealed the actually irrigated land is about 15%, with 13% field crops and 2% are fruits. Another actual 15% for non-irrigated land is 11% olives (the major single product with 70% of agro-land) and 4% vines and other products. Forest covers about 6% and grassland 60%, with 4-5% bare and urbanized. Products vary from citrus to legumes, vegetables, fruits and olives. Use is made of available water in rivers, canals and water wells. Vegetable production is varied: tomatoes, cucumbers, cauliflower, cabbage, eggplants, zucchini, onions, lettuce, watermelons as the major ones, occupy the plains and river banks. Major cereals include wheat and barley. Fruits are also varied, with significant production of apples, pomegranates, and pears. A few freshwater fisheries exist in the Hasbani River which serve some restaurants and partly for the local community. Growth in this sector is constrained by persistent river pollution, and lack of governmental assistance.

A recent trend is the growth of agricultural production from greenhouses. The use of heavy machinery is also increasing, as is irrigation and the use of insecticides and herbicides. The increasing intensification of agricultural production is not monitored closely for environmental effects, nor is it usually supported by agri-training. Pastoral land use is very low reflecting the lack of accessible rangeland and widespread land degradation. Chicken husbandry is increasing in the area with at least 200,000-300,000 heads produced for meat and another 50,000 for producing eggs to the local market.

## Climate

As a typical Mediterranean climate, the region is characterised by a wet short winter and a long hot and dry summer. The annual rainfall ranges between 600 -1100 mm/year, with annual average standing at 940 mm, leading to a total precipitation of 565 $Mm^3$ over the watershed (Abdallah et al. 2006). Rain falls for around 90-120 days between September and April, but 90% of the total annual precipitation falls erratically between the months of November and March (MoE 2001; MoT/PW 1977). Snow (where it accumulates on high mountains and slopes normally exceeding 1200m elevation, though under severe weather conditions may go down to 800-900m) falls between December and March. This means that the rest of the year, especially in the dry summer, not only there is a high need for water, but also that there are often shortages. Indeed, the frequency of droughts is increasing recently, which is important because it is already known that precipitation declines to 60% and even 40% in consecutive dry years (e.g. in 1988-91).

Increased drought frequency is one of the projected climate change impacts for Lebanon (Khawlie 2003). The HadCM2/HHGGax model predicts an average of 1.6°C increase in temperature by the year 2020, and an equivalent average of about 3% less precipitation (MoE 1999), though some local researchers project a higher value, but that comes from short time projections. Water balance is generally barely secured, with deficits commonly felt locally. The projection in ten to fifteen years, however, predicts an annual deficit of up to 800 Mcm with the business as usual scenario (see Introduction for regional climate projections).

Lebanon is divided, going from west to east, into four main climatic zones determined by its geographic location and the configuration of the terrain. This is due to two dominating high mountain ranges aligned north-northeast parallel to Lebanon's Mediterranean Sea coast.

These zones are: 1. Coastal stretch of narrow plains, up to about 200-400m elevation, which receives annually 700mm rain on average; 2. Mount Lebanon (or Coastal/or Western Mountain Range) rising with rather steep slopes to reach, in the north, to 3080m, receives anywhere between 800-1400mm rain, and snow on elevated areas; 3. The inner Bekaa plain averaging about 900m, receives between 700mm in the south down to 250mm in the north, and 4. The Anti-Lebanon range (or Inner/Eastern Range) further inland (whose highest peak is in Jabal ech-Shaikh-Haramoun at 2814m) receives between 300mm to more than 1100mm. The Coastal Mountain barrier is subdued in the south down to an elevation of about 600m, making the sea influence deeper inland than in the north. This, plus the fact that the inner mountain chain peaks highest also in the south, gives the Hasbani watershed, from Ibel es-Saqi west to Haramoun eastward, its climatic character. Along with the rainfall, the snow of Jabal ech-Shaikh charges the three main tributaries of the Upper Jordan River (i.e. Hasbani, Dan, and Banias) (Zeitoun et al. 2012), as well as the groundwater in the region.

## Water Resources of the Hasbani Basin

Authoritative information is lacking on the water resources of the Hasbani Basin. As with Lebanon generally, proper monitoring and data recording/updating in Lebanon is not consistent, sometimes reliable and often not continuous due to both technical and geopolitical challenges. The former include improper planning, lack of technical know-how and funding. There is a lack of quantification on: infiltration, runoff, aquifer rejuvenation, localised evapo-transpiration, snow-equivalence and other relevant processes. For southern Lebanon, geopolitical challenges include continuous Israeli interference in, and sometimes damage to, water resource infrastructure, notably public drinking reservoirs (most recently in the summer 2006 war); and also the unwillingness of the Lebanese government to develop new supply sources on the Hasbani River because of past Israeli opposition to, and past destruction of, such infrastructure (Zeitoun et al. 2013; Zeitoun et al. 2014).

The lack of accuracy of water statistics is well reflected in divergent figures on the annual water balance in Lebanon (Jaber 1994; Khawlie 2002): Tables 6.1 and 6.2 provide, therefore, an approximation. As indicated in Table 6.1, the estimated annual flow of the Hasbani River is 169 $Mm^3$ (million cubic metres per year).

*Wazzani Pumping Station*

### Table 6.1: Lebanon Annual Water Flows

| Source | Annual flow $mm^3$ |
|---|---|
| Precipitation | 8600 |
| Evapotranspiration | 4300 |
| Unexploited water (into ground & sea) | 880 |
| Underground losses into Israel/Palestine | 150 |
| Surface rivers to Syria (A'assi & N. el-Kabir) | 510 |
| Allocation to Lebanon from A'assi | 80 |
| Hasbani river | 160 |
| Exploitable ground water | 400 |
| Possible net available surface flow | 2280 |

### Table 6.2: Lebanon Freshwater Availability ($mm^3$)

| | | |
|---|---|---|
| Precipitation | Wet Year | 9000 |
| | Dry Year | 4500 |
| Evapotranspiration | Wet Year | 4500 |
| | Dry Year | 2250 |
| Surface Water | Coastal Rivers | 2570 |
| | Internal Rivers | 1305 |
| Ground Water | Losses to the sea | 270 |
| | Losses to Syria | 175 |
| | Losses to Palestine/Israel | 125 |
| | Stored groundwater | 1156 |
| Spring Water | | 1150 |
| Available Water | Surface water | 2200 |
| | Ground water | 1200 |
| **Total Available Water** | | **3400** |
| **Inaccessible surface water** | | **2000** |

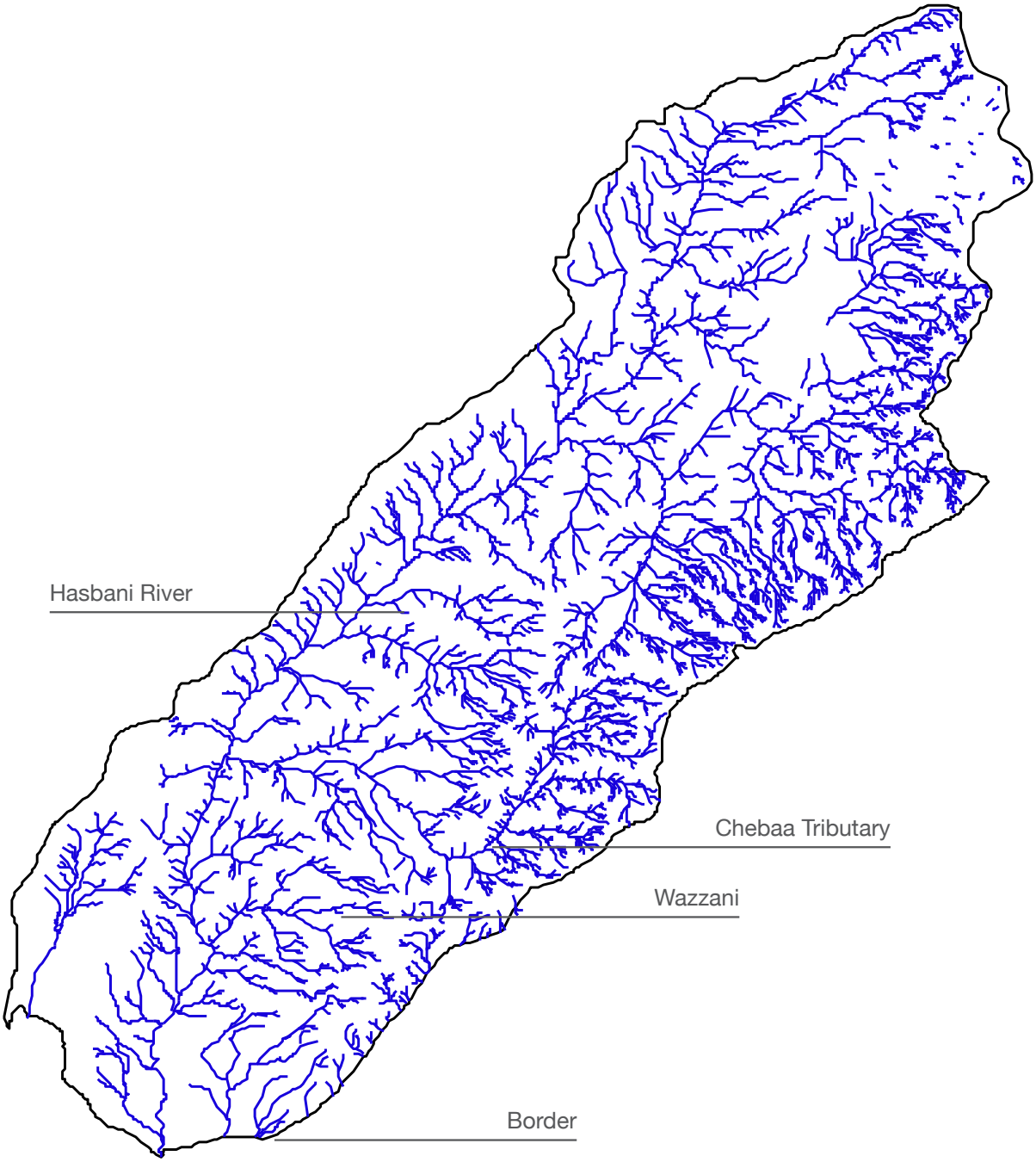
The density of drainage lines shown in Figure 6.5 is a reflection of the ruggedness of the Hasbani Basin, notably within Jabal ech-Shaikh. It is an indication of water infiltration/non-infiltration in the subsurface, which is important for groundwater rejuvenation under the cover of snow as observed for around 4-5 months.

As stated above, the annual rainfall over the Hasbani Basin ranges between 600 -1100 mm/year, with annual average standing at 940 mm. Once again, caution is advised in interpreting these figures in view of the increasing frequency of drier conditions in recent years. Merheb (2010) calculated the natural water balance over the Hasbani Basin, with baseline annual data from 2005, using the Water Evaluation and Planning (WEAP) system. He estimated precipitation at 463.9 $Mm^3$ with irrigation at 18.4 $Mm^3$, a decrease in soil moisture at 97.9 $Mm^3$ ; evapo-transpiration at (minus) 86.3 $Mm^3$, groundwater flow at (minus) 171.1 $Mm^3$, surface run-off at (minus) 91.8 $Mm^3$, and increase in soil moisture (minus) 100.9 $Mm^3$; he further indicated the water demand as: Water for domestic and non-domestic use at 12.5 $Mm^3$, water for irrigation at 89 $Mm^3$, and for livestock at 0.2 $Mm^3$. Drawing partly on the data from Merheb (2010), Zeitoun et al. (2012: 51) offer a higher-end estimate of *total water abstraction from the Hasbani Basin of 8 $Mm^3$* comprising 3.7 $Mm^3$ from nine public wells, 0.7 $Mm^3$ from private wells and approximately 4 $Mm^3$ from the Wazzani pumping station.

Starting with the main natural water flows, the Hasbani River, with three tributaries: Nahr Abou Djaji; Nahr el Fardis and Nahr Sreid (with minor seasonal rivulets contributing to the tributaries, as several springs and snow-melt from Haramoun-Hasbaya area and Bekaa el-Gharbi send their waters to join course) that contribute on seasonal basis to supply the Hasbani watercourse. The Hasbani watershed covers an area of 670 $km^2$. The total river discharge from Hasbani, Sreid and Wazzani Springs is estimated by the Litani Authority to an approximate annual average of 145 $Mm^3$/yr (Abd El Aaal Associates, P.C.). The Hasbani flows for around 22km then it is joined by the waters of the Wazzani spring in the vicinity of Ghajar village and continues towards the border to the south for a few km only.

Water quality controls for natural flows and sources are not strict in the Hasbani Basin. This is quite noticeable in summer when water is physically scarce. Key sources affecting water quantity and quality include: uncontrolled and untreated waste water dumped into the rivers (then used for irrigation); illegal drilling of water wells lowering the water table; and contaminated surface water from the use of insecticides, herbicides, fungicides and chemical fertilizers, especially in agricultural areas (Badr et al. 2014).

**Figure 6.5: Main Drainage Lines over the Hasbani Basin (indicating the flow paths of the Hasbani River and its main tributary al-Wazzani close to the border)**



## (Post)Occupation Context

The area has witnessed a long history of aggressions since the creation of the state of Israel, starting with: annexing the Chebaa Farms in the 1950-60s (a set of agricultural settlements adjacent to Chebaa town); preventing the local community from full benefit of the Hasbani-Wazzani waters; occupying parts of the region from 1967 (Ghajar area and Kfar-Shouba Hills) along the rest of the Golan, and then total occupation from the 1980s onward till 2000; forcing locals into mercenary-type militias, and still keeping partial occupation with intermittent intervention till the present day. These represent direct impacts of (post)occupation affecting lives and livelihood choices, with farming communities displaced and farms abandoned.

There are also longer-term, indirect effects associated with insecurity and instability in local communities, compounded by repeated military interventions. For example, during the Israeli occupation, 'passive' civilians were sometimes even allowed to work in Israel and gain new knowledge in agro practices. This created internal social divisions that have persisted even since 2000. Despite the lack of financial and technical assistance from the Lebanese Government, a large number of people returned to their villages and towns encouraged by moral attachment to the land, to family roots, and with financial encouragement by the private sector (especially emigrants). The latter is playing a crucial role in the re-development now taking place there. But in those zones adjacent to the border, a general feeling of insecurity remains, belying the formal end to Israeli occupation and the security zone. Reported military-security interventions under 'no-peace' conditions include: shelling, sniping, regular military flyovers and movement restrictions near the border, and farming restrictions. A major, ongoing legacy are the military mines planted by Israelis in the 1980s, often claiming lives of farmers and herders and, recently, even Israeli soldiers venturing onto Lebanese lands.

For agricultural operations, the occupation led to major social and economic dislocation through: barriers, check points, and military interventions disrupting daily agro practices and market access. Feelings of insecurity and fear prevented many farmers from tending to their fields, with much land abandoned. Whether there are enduring impacts from these changes was a key question for the project survey; for example, the abandonment and degradation of agricultural land; a decrease in agro-diversity and planted areas; decreases in agro-professionals and working labour; and changes in land ownership. The survey and focus group work targeted water availability as an indicator both of (post)occupational practices and climate variability and/or change. Israeli interference in Lebanese extraction of shared waters both pre- and post-dates the formal occupation, with close monitoring and control over Lebanese development projects affecting and utilising Hasbani/Wazzani water sources.

## Socio-Economic Indicators

As shown in Figure 6.2 above, there are about 57 human settlements in the Hasbani Basin, mostly of poor aggregated municipalities, with only 3 major centres. The population census is dated; more recent estimates indicate a regional population of approximately 170,000 with 2.2% average growth (SLC 2002). Land use and zoning is erratic, due to poor government management, but especially due to the long history of conflict. Administrative and functional services are fragmented, with weak local governance (municipalities). For the Lebanese Government, the area is remote and insecure, so there is a general lack of development plans and institutional capacity. The transport network is extensive, but mostly old with limited upgrading and maintenance. Educational attainment is lower than other Lebanese areas. Public services, such as parks, libraries, clubs, and support facilities, are lacking (Sharrouf 2012). Similarly, labour standards for agriculture and other sectors are rather low.

Women, youth and NGOs presence have become more recently potentially promising. Overall financial municipal capabilities are terribly deficient; with regulatory control and tax system still weakly effective.

The demographic pyramid in the Hasbani Basin is a broad based one with almost 31.4% of youth and 4.3% of old age. Most working women are still in classical domains, i.e. agriculture, teaching, health, tailoring, and related. Working power (normally multiple sourced) is mostly in agriculture at 70%, trade and services about 16.3%, and industry is 3.7%. The area witnessed a social upheaval after the Israeli withdrawal from Lebanon in 2000. Key manifestations of this are: Increasing urbanization; increasing youth independence - even inter-marriages, with nuclear rather than extended families; general decrease in fertility; a transfer from agricultural employment towards services; increasing education of women; and an increasing cost of living.

# Jordan Rift Valley: Vulnerability and Adaptive Capacity Assessment

Sireen Abu-Jamous (lead author) and Ziad Mimi

## Determinants of Climate Vulnerability

### Biophysical Factors

#### Climate Change

When farmers were asked in the survey questionnaire about climate change the most salient findings were temperature rise and precipitation decrease; 93% of the surveyed Palestinian farmers expressed that the there was a change in the mean temperature mainly in the past ten years where the increasing temperature became highly noticeable.

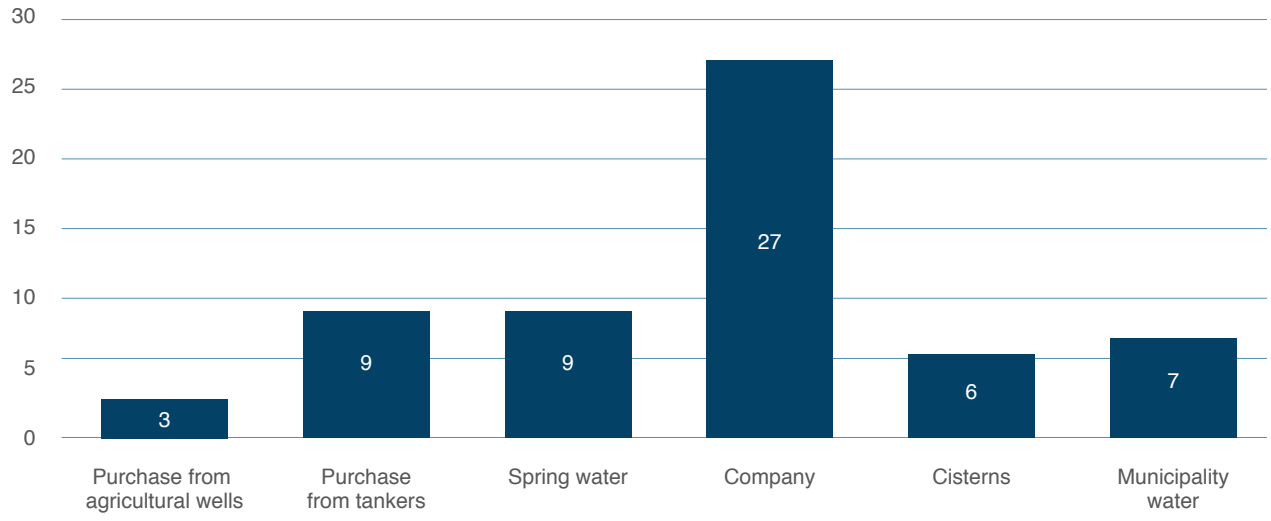
91% of surveyed farmers noticed a significant decrease in the amount of rainfall, reporting that the rainfall decrease is more than the half compared to ten years ago. This change in the rainfall is significantly affecting the recharge rate of the groundwater aquifers, which are the main water source for the Jordan Valley. This fall is confirmed by is the drop in pumping rates from the agricultural wells in the study area. The increase in temperature and drop in rainfall is reflected in drought conditions: 83% of farmers stated that the impact of drought had increased in the past ten years. Flash floods had become less frequent (according to just over 75% of farmers); the noteworthy flash flood that happened in January 2013 in the study area was the first of its kind in ten years. 91% of farmers referred to climate change as the main bio-physical factor affecting their agricultural practices.

#### Water

##### Water for Domestic Use

The primary source for domestic water in the surveyed communities is Mekorot (the Israeli water supply company): other sources include spring water, the purchase of water from tankers or agricultural wells, notably during the summer and for communities not connected to the water network, municipal water wells and rainwater harvesting cisterns. For most farmers there is always enough to meet their domestic needs (89%) and the average monthly consumption of water for domestic purposes ranges between 30 to 35 litres/month from all sources. Figure 7.1 below shows the main water resources in the surveyed communities and the percentage of dependence. The quality of domestic water in most of the surveyed communities has improved due to development projects implemented during the last five years.

**Figure 7.1: Water Sources for Domestic Use**



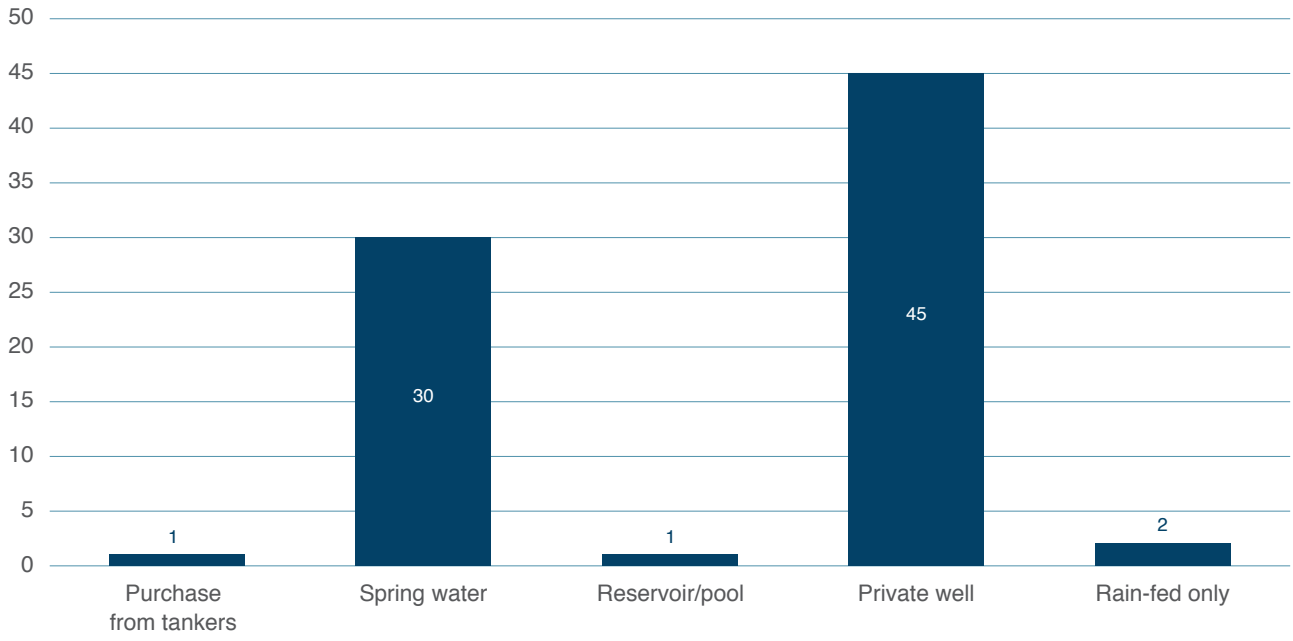
### Water for Agricultural Use

Figure 7.2 shows that the main sources for the agricultural water use are private wells owned by farmers and springs. Other minor sources (below 2%) include rainwater harvesting through reservoirs and pools and the purchase of water from tankers.

*Oja Spring as a major water resources at the Jordan Rift valley*

67% of interviewed farmers agreed that the quantity of water available for agricultural use, from all resources, is decreasing and has become more noticeable in the past 5 years. Water supplies are not enough to irrigate the land they cultivated in the past; currently farmers cultivate only certain areas they know they can irrigate i.e. cultivated area is decreasing according to the available water. Also, one of the problems stated by farmers is the significant drop in the groundwater level during summer where wells start pumping turbid water mixed with soil which is not suitable for irrigation. As indicated by most farmers (over 55%), the quality of water used for agriculture is deteriorating; mainly referring to the high salinity of groundwater from agricultural wells. Reasons for the increased salinity, from farmers' perceptions, are over-pumping from groundwater wells, the decrease in rainfall and low recharge rates.

**Figure 7.2: Water Sources for Agricultural Use**



### Soil quality

Over the past decade, 29% of interviewed farmers have not noticed any change in the land quality, while almost 45% of farmers stated that there is a moderate negative impact. The increasing experience of drought conditions is perceived to be reducing soil quality, leading farmers to spend more on money on pesticides and fertilizers. Many hazardous chemicals once used are now banned under Israeli law so are no longer sold to Palestinian farmers. Over 91% of farmers use organic fertilizers in addition to the chemical ones, whereas 7% use only natural fertilizers.

Reduced soil quality is also attributed by farmers to occupational practices. Some areas are used for military purposes and occasionally tanks drive over agricultural lands: according to farmers, the massive weight of the tanks makes the soil very compacted and no longer suitable for agriculture. The rehabilitation of such land is a long process involving deep ploughing.

## Occupation-Related Factors

The Jordan Valley used to be the food basket for the West Bank and the predominant profession was agriculture as the main income source for the majority of people living in the area. As agriculture is deteriorating as a profitable business due mainly to occupation-related restrictions and climate change, agriculture is often no longer sufficient to meet farmers' needs. 52% of the surveyed farming households stated that their agricultural income is not enough to meet their basic needs. Insecurity of land tenure as a result of the Israeli occupation is a serious constraint on farming viability. As 81% of the Jordan Valley is zoned Area C, Palestinians have limited ownership options for agricultural development. Only 26% of the surveyed farmers were land owners while 29% are tenants and just over a third of farmers have partnership agreements with land owners. There is evidence also of Palestinians leasing lands from Israeli settlers because of land and water shortages (Hass 2013). Occupation-related restrictions on farming viability are accentuated by climate-related stresses, notably increasing temperature and decreasing rainfall.

### Market Vulnerability

The agricultural local market suffers from competitive foreign products, especially from Israel: according to farmers, Israel dumps settlement products onto the Palestinian market, especially during peak production, in order to eliminate Palestinian products that may supply the local markets. More recently, traders have started importing some lower-priced products from Jordan, also undercutting the domestic Palestinian market. Israeli restrictions on Palestinian marketing restrict access to regional and international markets; 97% of the surveyed farming households market their products locally and 33% manage to import to Israel through an agent.

Small farmers are the most vulnerable group in the agricultural business chain: large traders often dictate market prices, forcing farmers to sell their products at low prices and minimum profit; for example, traders take advantage of the fact that farmers have to sell their products as soon as possible while they are still fresh. Also the complete dependence on Israeli production components, such as fertilizers, seeds and irrigation networks make it difficult to find Palestinian alternatives to Israeli goods, meaning that Israeli companies control price and quality.

### Water Pricing

As the main source of water in the Jordan Rift Valley is groundwater, water price is always a factor in pumping water from groundwater wells; most of the Palestinian wells use diesel for pumping and as the diesel price goes up, so do water prices. Some areas, like Ras Al Fara'a, have managed to lower the water price by using electricity instead of diesel for pumping water. Water prices vary between NIS 2.5 to 4 per cubic metre for diesel-pumped water from ground

water wells: this cost drops by 40% for water from groundwater wells using electricity, while purchasing water from tankers remains more expensive. In comparison, Israeli farmers in the Jordan Valley pay on average NIS 2.1 per cubic metre for their water, though 50% of their water is subsidized at NIS 1.9 per cubic metre (Hass 2013).

The political situation continues to be one of the main constraints prohibiting the agricultural sector from developing. In the questionnaire farmers were asked to identify restrictions related to settlements and military measures. The three most important settlement-related restrictions were: (i) competition from settlement farms (ii) high water consumption reducing water availability for Palestinian farmers, and (iii) developing crop diversity not available for Palestinians. The three most important categories of military-security effects were: (i) land confiscation, (ii) military zones with movement restrictions, and (iii) restrictions on marketing Israeli goods.

# Adaptive Capacity

## Current coping mechanisms

Palestinian farmers in the Jordan Valley have responded to reduced water availability – both occupation-related and climate-related – by reducing production of crops considered to be high water consumers, notably bananas, watermelon and different kinds of citrus fruits. Also some crops, like eggplants, cucumber, cauliflower and green peas, which used to be cultivated over the year, are now cultivated only during the winter season. In most of the surveyed communities the summer season (between June and September) has disappeared due to water shortages in summer as well as the high temperature. Current coping practices must be understood in the context of recent historical changes. Before 1978, the dominant water irrigation system was flood irrigation through water canals and open channels where water had plentiful availability. Drip irrigation was introduced after 1978 when water availability started to become an issue for farmers. Dates were introduced to the Jordan Valley in the late nineties to cope with the water quality available; dates can tolerate saline water, and are also considered a profitable crop and commercial products due to the high revenue and the special quality of the Jordan Valley's dates (e.g. the Medjool date).

Some coping practices are well-established; for example greenhouse-based agriculture was introduced to the Jordan Valley in the early 1990s to reduce evaporation due to high temperatures, although there has been a major uptake of greenhouse use in recent years, as noted below. In the surveyed communities, 95% of the farming households reported that they undertook coping practices. A number of coping mechanisms were captured during the survey including:

### Change of Crop Selection

- to crops with a lower water requirement;
- to crops tolerant to high water salinity.

### Reduction of Production and Cultivated Area

- to cope with the low water availability;
- to reduce capital costs of agricultural inputs, especially for farmers with low income rate;
- to reduce the risk of the financial loss due to poor marketing environment.

### Increased Greenhouses Agriculture

- 35% of respondents started greenhouse agriculture in the past five years;
- However, a restriction on adopting greenhouse agriculture is the high-cost construction and maintenance; 71% of farmers using greenhouses are classified as high income.

*Greenhouses at Jordan Rift Valley*

### Drip Irrigation

- Drip irrigation as a coping mechanism has been adopted by many farmers and was classified as one of the most effective coping mechanisms.

### Partnership System in Agriculture

- A new system of agriculture has appeared between farmers; mainly small farmers, and land owners or well owners, where the land owner offers the land, water and/or agricultural inputs and both have a prior agreement on the shares.

### Agreements between Farmers and Traders

- As many farmers are financial unable to start their own agricultural business, new agreements have been emerged between small farmers and traders from the local market: the traders support farmers with the main agricultural inputs to start cultivation and the farmers pay them back after harvesting and marketing the products, through the same traders, in the local market.

| Crops that are no longer dominant in the JV | Reason |
|---|---|
| Cucumbers | Not competitive in the market. Open field cultivation of cucumbers is no longer feasible; each dunum in the greenhouse produces around 10 tons compared to 2 tons in the open field. Also, cultivating cucumber in the greenhouse requires less labour. Cucumber is cultivated now mostly under forward contracting; mainly to be used in pickling factories locally or in Israel |
| Bananas | The availability of water because bananas are considered high water consumers |
| Citrus | Citrus are high water consumers and need fresh water |
| Tomatoes | Increase viruses in the soil; became expensive for farmers where they have to use a lot of pesticides, in addition to the high risk of losing the whole harvest |
| Eggplants | Eggplants used to be cultivated for export and now, as farmers lack access to international market, are no longer feasible, especially with higher quality and lower-priced imported eggplants in the local market |
| Broad beans | Low economic value |

### Moving to Work in other Areas

- During the past three years, many farmers from Al Jiftlik (around 150 farmers) have moved to Al Fara', whether they own land or they rent land, as agriculture in Al Fara' is more feasible due to greater water availability. Also, during the past five years many farmers from Al Jiftlik (between 70 and 80 farmers, including women) have moved to work in settlements in agricultural activities. Also, in Al Auja, around 1000 farmers moved to work in neighbouring settlements

## Obstacles Facing Development of Adaptation Measures

93% of the interviewed farmers stated that their current coping practices are useful only for the short term. They noted that long- term coping mechanisms (i.e. adaptation) have to be managed on a sector level and that the Palestinian government has to be more involved in adopting adaptation measures for reduced water availability. From the questionnaire administered in the study area, Palestinian farmers identified the following as the most significant obstacles to the development of adaptive capacity:

*Interviewing one of the farmers at the Jordan Rift Valley*

### Limited Sources of Water for Agricultural Purposes

- Limited number of irrigation sources; 64% of the surveyed farming households depend on a single source of agricultural water. This limits their ability to cope with the decreasing water available for agriculture.

### Lack of Support from Organizations

- Most farmers in the survey stated that they lack support from external authorities and organizations, whether national (Ministry of Agriculture and Palestinian Water Authority) or international organizations. According to the farmers, these authorities and organizations should have more responsibilities in:
- Introducing additional water sources for agriculture; this includes negotiating with Israel to drill more wells and rehabilitate some of the existing wells in addition to finding alternative, non-conventional water resources;
- Subsidizing agricultural inputs as they are considered very expensive and controlled by the Israeli market;
- Providing training and advisory services; 59% of interviewed farmers stated that most of their adaptive agricultural practices were self-developed, 40% stated they observed other farmers and learned from them and only 16% had benefitted from extension services, including training provided by the Ministry of Agriculture;
- Developing an insurance system to compensate farmers in cases of losses; either by Ministry of Agriculture or by private sector companies.

### Financial Restrictions

- Most farmers in the Jordan Rift Valley have no other sources of income and do not have savings to help them develop mechanisms to adapt to lower water availability and the deteriorating situation of agriculture. For example, many of interviewed farmers stated that they would change to greenhouse cultivation if they received financial support.

# West Bank Focus Group

A focus group was held in September 14, 2013, and took place in the Youth Club in Al Jiftlik – Jericho. It was attended by number of participants from Al Jiftlik including farmers, members from the Village Council and members from the Farmers' Cooperative. The goal of the focus group was to 'test' and develop findings from the survey of farming households. In particular, it was designed to gather information from the farmers and other stakeholders in regard to the following:

- Coping mechanisms and adaptive capacity to differential water availability in the Jordan Rift Valley;
- How climate-related pressures and occupational practices affect agriculture in the region;
- The cultural and political identity of the farmers in the Jordan Rift Valley.

## Coping and Adaptation Mechanisms

The results and findings from the questionnaire analysis were presented to participants to elicit their feedback on the parts related to coping mechanisms and adaptive capacity. The sections below present additional comments on the results and are not meant to repeat the results presented in the questionnaire analysis report.

### Water

The focus group confirmed *forced migration* as a major coping mechanism in the face of reduced water availability. For families with agriculture as their sole source of income, some have experienced internal movement to areas with greater land and water availability, renting land and practicing agriculture. This migration is taking place at two levels: internally as the movement between Palestinian lands in the search for better agricultural conditions (mainly water availability); and to Israel and settlements to work in agricultural or other jobs in order to secure a source of income.

In terms of adaptive capacity, the focus group identified potential from:

#### Soil Enhancement

- Recent research on soil with a lower crop water requirement, notably artificial soil that consumes only 10% of the crop water requirement; it was beneficial to use such research to find solution for the water shortage problems in order to enhance agricultural practices in the area.

#### Water Harvesting

- Water harvesting can be one of the fundamental solutions for the water shortage by construction of dams and pools to benefit from the runoff and wadi water in the winter and store it for irrigation use in the summer. Yet farmers are not allowed to construct even small dams; it was reported that the Israelis once demolished a small dam constructed by a farmer for his own local agricultural use.

#### The Role of the Palestinian Authority

- The Palestinian Authority is seen as responsible for providing farmers with good quality and acceptable prices for agriculture. The focus group claimed that the Palestinian Authority can negotiate with the Israeli Authority to supply Palestinians with reasonably priced water from Mekorot Company for agricultural use.

#### Better Management and Allocation of Water

- It was also stated that the Palestinian Authority can construct conveying systems to transfer water from areas rich with water resources, like Tulkarm and Attil, to areas having water shortage problems like the Jordan Valley.

#### Use of Treated Wastewater

- Treated wastewater, as a non-conventional water resource, was identified as a very important source for agricultural use. Currently a new constructed wastewater treatment plant in Nablus can provide around 8000 $m^3$ a day, also the current upgrading

of Jenin's wastewater treatment plant will provide up to 5000 $m^3$ a day. Also, the Al Beireh treated wastewater plant is not being used to date although the plant is considered the only one functioning well and providing acceptable treated wastewater quality in the West Bank. If this works, conveying systems and networks can be constructed to supply most areas in the West Bank with water for agriculture.

### Fair Water Management

- There are issues of equitable water allocation between Palestinian communities. For example, some areas in Jenin were converted to irrigated-agricultural and supplied the water for Al Fara'a, while Al Jiftlik was suffering from water shortage. Part of the problem can be solved internally with good water management and equity in water allocation. Also, in Tubas deep wells have been drilled for agricultural purposes which reduced the water discharge in Al Jiftlik wells

### Countering Israeli Measures

- In Al Auja, there are three deep Israeli wells that have negatively affected the shallow Palestinian wells and reduced the quantity the Palestinians can pump from their wells. The Oslo Agreement prevents the Palestinians from drilling deep groundwater wells; the allowed depth is only 120m.

## Land

Agricultural land is threatened with confiscation by the Israeli Civil Administration if abandoned and not cultivated; water should be available for farmers to keep them attached to their land. The focus group stated that there should be a political decision to support farmers and enhance their resistance (*sumud*), because for most farmers agriculture is the sole source of income and if they cannot sustain themselves from agriculture they will move to other jobs and leave their lands. Land confiscation as a result of occupation is the key driver of forced migration for affected farmers.

According to the focus group, adaptation measures identified in relation to land include:

- Enhancing the role of the Palestinian Authority in supporting farmers and agriculture;
- Investing more in supporting infrastructure; e.g. agricultural roads, electricity service. In some cases the extreme weather events have destroyed the infrastructure, affecting the accessibility of farmers to reach their lands;
- Introducing new water resources for agriculture use, as water is the main restrictive factor to maintain land cultivation and farming practices;
- Establishing an organization that facilitates loans for farmers for agricultural practices;
- Enhancing collective agricultural action; farmers' cooperatives can facilitate buying agricultural inputs and marketing farmer's products;
- Making the market for agricultural inputs more competitive. For Palestinians agricultural inputs are 40% more expensive than Jordan and Israel. One reason is that the Palestinian Authority gives licence for some companies to be the sole distributor for some agricultural inputs which plays a main role in their high pricing of these inputs. The Palestinian Authority can remove these monopolistic practices, opening up markets to competition.

## Proposed Adaptation Measures

According to the survey of farming households, farmers have long been coping with water scarcity and Israeli restrictions and are already at the edge of livelihood viability. The majority of the surveyed farmers argued that it is time for governmental organizations to take the lead and support farmers in developing adaptation measures to cope with the challenges facing the agricultural sector, including current and

projected impacts of climate change. The focus group agreed that adaptation should include measures related to more water being available for agriculture, financial and marketing support, training and guidance. Also, farmers mentioned the importance of local NGOs to take greater roles in supporting the agricultural sectors; constructing greenhouses, providing agricultural inputs, training and advisory services. Agreed priority adaptive actions were:

- Enhancing the role of the Ministry of Agriculture in determining the cropping patterns and cultivated crops each season in order to control fair prices for products;
- Support for agricultural insurance, where the government is a main partner (the government can cover 50% of the insurance);
- Activating tax refunds for agricultural inputs, as in neighbouring countries. In Palestine a system exists and farmer can register for tax refunds, but the problem is that the Palestinian Authority does not have the funds to pay the farmers. Also, some farmers are not aware of their right to tax refunds;
- A stronger labelling and marketing system for Palestinian products;
- A more open market for the agricultural inputs in order to allow for fairer competition and more affordable prices for agricultural inputs.

## Culture and identity

The value of the land and agriculture was discussed with the focus group. What does it mean for farmers to stay on their land and cultivate it in spite of all the problems and challenges they face? The focus group identified different sources of collective identity related to the persistence of agricultural livelihoods.

### Religious Beliefs

From a religious point of view, believers (both Muslims and Christian) believe that Palestine is a holy land and the Land of Prophets. Historically speaking, Jerusalem has generally been the site for Muslim pilgrimage, prayer, study or residence. Al-Aqsa Mosque is a particular seat of learning. In addition to many other religious Islamic sites, Muslims believe that the Dome of the Rock is where the prophet Mohammad ascended to heaven. Also, there are many important Christian sites in Palestine such as Bethlehem, Nazareth, the Jordan River and Jerusalem was where Christ was crucified. Most Palestinians are attached to the land on a religious basis; for Muslims, staying on the land becomes a form of spiritual resistance *(jihad)*.

### National Beliefs

Farmers are aware of the fact that any land that is abandoned will be confiscated by the Israelis, making them responsible for keeping the land; one participant stated, ‘even if I lose money from practicing agriculture on my land I will not leave it for a settler to take it from me and my family’. The retention of land is connected to Palestinian self-determination.

### Family Bonds

Historically, agriculture has been considered a family business where the father and all his sons and daughters work on the land and agriculture was the main income for all family members. Most farmers have inherited their lands from their fathers or grandfathers and feel that it is their responsibility to keep the land for future generations.

# Occupied Golan Heights: Vulnerability and Adaptive Capacity Assessment

Muna Dajani (lead author) and Ziad Mimi

## Determinants of Climate Vulnerability

### Biophysical Factors

#### Climatic Changes

In the questionnaire survey of the farming households in the occupied Golan Heights, as in the other study areas, respondents were asked about their perceptions of variability/changes in local climatic conditions. Table 8.1 summarises the results to this question. Most interviewees (79%) agreed that the Golan Heights area is experiencing an increase in mean temperatures, which they also claimed was detrimental to agricultural productivity (especially for orchards). These changes were noticed on average over the past 15 years. For mean rainfall, 60% of the sampled households stated that they have experienced major fluctuations in rainfall, while 32% believe mean rainfall has decreased over the past two decades. There was a perceived decline in snowfall precipitation (68%) over the last 15 years.

90% of the sampled farming population stated that these climatic changes are negatively affecting their farming practices, since their fruit products (especially apples) are highly sensitive to temperature and rainfall changes, requiring winter coldness (dormancy) and ample water in the growing season to ensure high quality produce. Highlighting the role of Israeli policies in addition to the climatic conditions, 57% stress that both Israeli policies and climatic fluctuations are affecting their farming: 19% attribute these farming changes solely to Israeli water allocation policies, while 22% attribute them solely to climatic stresses (see Figure 8.1). 19% of the sampled farmers had insurance against crop loss from natural disasters.

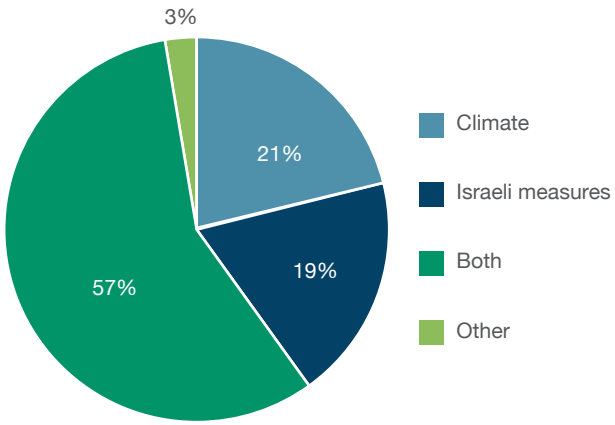
**Table 8.1: Perceived Climatic Changes in the Occupied Golan Heights**

| | Direction of change | Average duration of change (years) |
|---|---|---|
| Mean temperature | Increase (78.4%) | 15 |
| Mean rainfall | Fluctuation (59.5%) | 14 |
| Mean rainfall | Decrease (32.4%) | 14 |
| Snowfall | Decrease (67.6%) | 15 |

#### Water

According to the questionnaire respondents, water availability is not the major constraint on farming practices in the occupied Golan Heights; rather it is the asymmetric allocation of water resources and Israeli control of water resources. On a domestic level, most interviewees indicated that they are satisfied with the water quantity and quality they receive. This is due to the abundance of water resources in the area and the existence of a functioning water network. Additionally, some areas in the village of Majdal Shams rely also on spring water that originally used to provide their families with water. Today, they utilize both spring water and tap water to meet their needs for domestic water use.

**Figure 8.1: Farmers' Perceptions of Main Reason for Changes to their Farming Practices**




### Water for Agriculture

As stated in the study area profile, there has been a transformation in agriculture in the occupied Golan Heights in terms of the type of crops, land and water availability. The agricultural practices today depend on three sources of water: Mekorot (the Israeli state water company), spring water and rainwater reservoirs. Mekorot today allocates a fixed sum of water to the Syrian farmers of the Golan, which is later managed and divided by the 20 agricultural committees of the region. Farmers depend solely on this water source during the summer season (May-October) to irrigate their orchards. In the winter, dependence is mostly on rainwater. Nevertheless and due to the sensitivity of the crops irrigated, the water allocated by Mekorot is not sufficient to meet agricultural water needs during the dry season. Most interviewees (76%) stated that at the end of the season, water restrictions by Mekorot negatively affect the most sensitive part of the season, reducing the quality of the produce. Over 40% of interviewees stated that the water allocation they receive today rarely meets their needs, while 24% stated that it never meets their needs.

Through a simple comparison, the interviewees receive annually an average of 107 cubic metres/dunum (official average is 120 cubic metres/dunum) while the Israeli farmers in settlements receive 800 cubic metres/dunum.

In terms of tampering with agricultural water sources, most interviewees (86.5%) rarely witness physical destruction or damage of water sources by Israeli authorities, aside from the destruction of rainwater reservoirs that Israel deemed illegal after its annexation of the Golan Heights in 1981.

### Product Cultivation

Before 1967, the Golan Heights and the rest of the Syrian agricultural lands were primarily areas of rainfed agriculture. Certain crops were suitable for this type of agriculture and farming practices. With the 1967 occupation of the Golan Heights and the technological advances of 'industrial' scale agriculture, most agricultural production shifted to *irrigated, monoculture cultivation* with a focus on orchards. Since 1967, drip irrigation was introduced by Israel to the region and has since been used as the main water-saving technique of irrigation.

*Young orchard near Ram Lake*

This, in addition to a number of political, economic and social reasons, has shifted the type of produce grown and cultivated in the region. From our survey interviews, these main crops were mentioned as crops that were cultivated in the past but are no longer grown are: grains, cabbages and cauliflowers, lentils, pears, nectarines, vegetables, plums, almonds, radishes, lemons, oranges and olives.

### Quality of Land

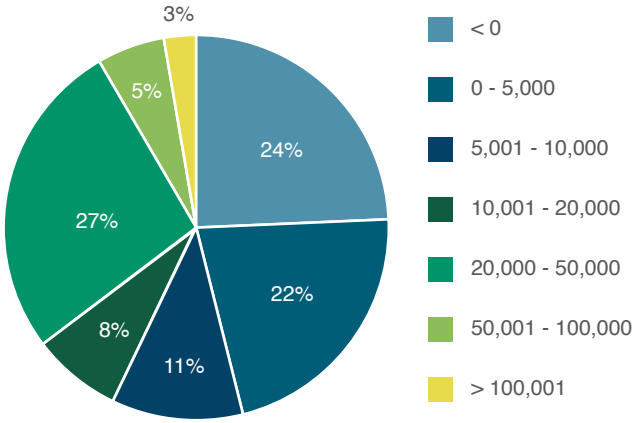
With the increased use of pesticides and chemical fertilizer to increase productivity of the industrial agriculture that developed in the Golan Heights after 1967, land quality has experienced many changes. When asked about the change to the soil, interviewees stated that the soil is becoming weaker and with higher salinity, causing weaker productivity and produce of lesser quality. The reasons for these changes were attributed to the increased use and dependence on chemicals, the switch to monoculture, and also to climatic and rainfall patterns fluctuations. Farmers interviewed mostly use chemical fertilizer (68%), while 11% use a mix of organic and chemical inputs and only 2.7% use organic fertilizer. 56% of those using chemical pesticides believe this has negative effects on their produce, especially the taste which used to be stronger when only natural fertilizer was used. On the other hand, famers believe that the pesticides used today are necessary to preserve fruit crops from pests and diseases.

## Socioeconomic Factors

### Farming Income

Although most Syrian inhabitants of the Golan Heights were originally farmers, most today do not depend on their land for their income. According to the survey, almost a third (32.4%) stated that agriculture is actually a financial burden on them, as they are losing more than they are making out of selling their produce. 43% stated that agriculture contributes up to 30% of their income. 78% of sampled stated that the income generated from agriculture today rarely (30%) or never (49%) meets their needs. These highlight how vulnerable are farmers today that depend solely on agriculture as their main source of income. All sampled interviewees stated that their main profession is not agriculture but rather in the field of medicine, accounting, tourism, trade and as contractors. 92 % of interviewees claim that their total income from agriculture is less than 50,000 NIS annually (Figure 8.2).

**Figure 8.2: Average Annual Income (NIS) from Agriculture**



This is also evident in the use of paid workers by land owners. Of the sampled population, 46% state that they solely depend on non-paid workers (family and friends) while 40.5% need up to 50 paid workers during the season to help with the harvesting. Only owners of large plots of land require more than 50 and up to 200 paid workers per season (10.3%).

Land ownership in the Golan Heights is mostly by inheritance. Due to the limited land available after Israel occupied most of the Golan Heights and declared extensive military and green zones, the Syrian population today owns only 20,000 dunums of agricultural land. Therefore, land leasing is not common. 92% of interviewees were landowners, while the remaining 8% were co-owners with other members of their families.

Due to the restrictions on land ownership and land confiscation, most plots of land are small. 62% of the interviewees owned land with an area between 1-10 dunums, 24% owned land areas between 10-30 dunums and 13.5% owned land plots with an area of up to 55 dunums. Additionally, the questionnaire respondents stated that land acquisition does not happen in the Golan Heights as most land is inherited and the idea of selling land does not occur unless there is a strong financial need. 8.2% stated that land was confiscated from them by the Israeli government on premises of the land belonging to the state or needed for military and security reasons (notably for land by the border). Also, the respondents reported incidents when Israeli police uprooted fruit trees and damaged crops.

### Access to Markets

The markets open today for selling Syrian produce in the Golan Heights is as dependent on political circumstances as economic and market conditions. In the local (Israeli) market, the produce from Arab farmers is negatively affected by competing Israeli and foreign products that flood the market. In addition to lacking subsidies and governmental support, Syrian farmers in the Golan Heights suffer from a local marketing monopoly by Israeli companies, which also market products from the Israeli settlements. Numerous permits are needed for product marketing and transportation.

The interviewees agreed that Israel is working indirectly and directly on limiting the access of Syrian farmers of the Golan Heights to markets. The permit system plays a role in delaying the marketing and transportation of farmers' produce 'legally' and imposes high fines on farmers without permits. Israel limits the access of Golan produce in West Bank and Gaza Strip markets, traditionally a major market for the farmers. The Syrian markets are totally inaccessible due to the political turmoil in the country. Since 2005 starting with 4,000 tons, the International Committee of the Red Cross (ICRC) has facilitated the export of Golani apples to Syria which has happened every subsequent year apart from 2008 (poor harvest) and 2012 (lack of Israeli authorisation). Despite the war in Syria, in 2013 the ICRC enabled the shipment of 14,300 tons of apples from Golan farmers to Syria (ICRC 2013).

In the occupied Golan Heights, there are 8 large coolers (storage facilities) in Majdal Shams (4), Masada (1), Buqatha (3). These coolers are collectively owned by the farmers who invested in their construction. The project of building the coolers was initiated by farmers to overcome the drop in apple prices in the market and provide produce around the year. Today, the coolers provide a total storage for 30,000 tons of apples.

### Water Prices

Water pricing was initiated by Israel after its annexation of the Golan Heights. For the past three decades, Syrian farmers have been paying higher prices for water in comparison to the highly subsidised farmers in the settlements of the Golan. Without subsidies and support from the Israeli government, farmers are obliged to pay for their water consumption on their farms in addition to transportation of this water to their lands due to lack of infrastructure. With the establishment of agricultural committees, the famers collectively were able to develop a system where administrative costs of water allocation were controlled. Nevertheless, due to the continuing lack of governmental subsidies, Syrian farmers are still subject to high prices of water for agricultural use. From the sample of farmers surveyed, the price for one cubic meter of water ranged from 2.3 to 6 NIS/cubic meter depending on the village and location of land. The farmers also pay additional charges to a farmers' association to transport the water purchased from Lake Ram.

### Support Systems

In case of experiencing losses due to environmental changes, the farmers of the occupied Golan Heights have no established support system on a governmental or even provincial level. Much of the support received is from nuclear and extended family (especially for the older generation of farmers), highlighting the strong bonds existing in the community. The lack of NGO and donor agencies present in the occupied Golan has increased the importance of communal action and management of resources in the face of environmental and occupation-related stresses.

## Political Situation

With the prolonged status of occupation and annexation of the Golan Heights, the livelihoods of the predominantly agricultural communities and villages have been transformed completely: this has isolated the villages from the rest of Syria. The villagers are partially included in the governing systems of the state of Israel, but their status as residents automatically deprives them of their basic rights. Focusing on agriculture, the current farming villages are faced with highly subsidised, government-supported agribusinesses located in Jewish settlements. The continuing military occupation also facilitates the confiscation of land from Golan farmers under the guise of security.

### Effects of Occupation on Crops

From the surveyed sample, the younger generation of farmers (aged 30-50) had not witnessed any damage or destruction to their products by the Israeli authorities. The older generation recalled several incidents when, they claimed, Israeli authorities had destroyed or damaged their crops. These accounts mentioned Israeli authorities claims that private land belonged to the state. In such cases, trees would be uprooted or land access denied. Sometimes, in defence of their land, the Syrian community has blocked the police from accessing the land. In other cases, land owners have filed lawsuits against the state to return their confiscated land. Land confiscation was prominent after 1967, where Israeli authorities planted mines and established border lines and managed to deny access and use of border lands for farming.

Through the questionnaire, the effects of the settlements and military occupation are explored through the viewpoints of the interviewees (Table 8.2). The negative implications of settlements and military rules are strongly experienced in the case of the Golan Heights. Nevertheless, it was also stated that the introduction of technologies by Israel since 1967 and the direct contact with settlements (through Syrian farmers seeking working opportunities there) has also enhanced the knowledge and skills of farmers, who adopted these newly acquired tools in their private lands in the villages.

**Table 8.2: Effects of Occupation on Agriculture in the Golan Heights**

| Settlements effect | Military rule | Need from government |
|---|---|---|
| Market competitiveness | Land confiscation | Support and guidance |
| Water allocation | No infrastructure development | Natural disasters management |
| Land availability | taxes | Water allocation |
| Recipient of government support | Military zones and mines | Market protection |
| Subsidies | New technologies and irrigation methods | Subsidies and insurance |
| Variety of crops | Limiting farming | Support research |
| Higher productivity | Destroying livestock production | Provide primary materials |
| Strong cooperatives | Controlling natural resources | Land reclamation |

Interviewees expressed their belief that, should there be a return to Syrian sovereign control of the Golan Heights, their farming would prosper due to the following reasons:

- Open markets to the Arab world;
- Water and land rights will be acquired and guaranteed;
- Governmental support;
- Farmers' skills and experience in farming is competitive compared to rest of Syria;
- More agricultural land would be available to expand production.

# Adaptive Capacity

## Coping Mechanisms

Due to the political realities, farmers have already developed and used certain practices to overcome the manmade and natural changes happening in the Golan Heights. Listed practices were discussed with the interviewees to gauge their usage. Rainwater harvesting was utilised prior to the annexation of the Golan Heights in the 80s, but since has become illegal and requiring numerous permits. It is still used today but not on a large scale (just over 40% of sample). The main coping practices used are changing crop patterns (apple types or replacing with cherry) and changing irrigation to drip system, especially after 1967 (see Table 8.3). In the case of the Golan, a familiar cooping practice is reducing production, simply by keeping fruits on trees and not picking them, due to

the lack of storage space and its high cost. Therefore, famers leave produce on trees merely to ensure they profit from farming at the end of the season. Another common practice is working as labour on other people's land, which can be in neighboring lands in the villages or working as labour in Israeli settlements.

**Table 8.3: Coping Practices used by Farmers**

| Coping practice | Used by (%) | When farmers started using them? |
|---|---|---|
| Rainwater Harvesting (Israel banned their use and incurred fines – no new structures after annexation) | 40.5% | 20-35 years ago |
| Changing crop selection | 62.2% | 1-40 years ago |
| Greenhouse cultivation | 0% | |
| Changing type of irrigation (Referring to switch from flood irrigation to drip irrigation) | 81.1% | 5-35 years ago |
| Increasing amount of irrigation | 8.1% | 5-35 years ago |
| Reducing production | 40.5% | 1-35 years ago |
| Buying insurance | 37.8% | 1-30 years ago |
| Taking remittances from household members | 10.8% | 5-7 years ago |
| Picking crops or using products from neighbours when my land does not produce sufficient output | 18.9% | 2-20 years ago |
| None | 2.7% | |

Table 8.4 lists the main source of adoption of coping practices, showing a high incidence of learning from other farmers (over 70% of the surveyed sample) and also a significant role of technological diffusion from Israel (almost a third of the sampled farmers). Farmers in the Golan Heights recognize the need to take action to cope with the climatic changes and the 'manmade' policies of the Israeli occupation. Table 8.5 lists their identified priorities for adaptive action and perceived constraints on these actions. 89% agreed that there is a need for adaptive action, but less than half (46%) acknowledged the possibility of change. The identified needs are focused on technical, economical and agricultural development needs, highlighting that farmers are willing to continue working in farming but require governmental and institutional assistance.

**Table 8.4: Sources of Adoption by Farmers of Coping Practices**

| How did you begin to use these methods? | Frequency of answers (percentage) |
|---|---|
| An organization raised my awareness and trained me | 1 (2.7%) |
| I observed other farmers using these methods | 26 (70.3%) |
| I identified a need and developed these methods on my own | 3 (8.1%) |
| Agricultural experts shared their knowledge on technology | 3 (8.1%) |
| All farmers used the methods | 4 (10.8%) |
| Collective projects, farmers identifying needs and acting | 3 (8.1%) |
| Technologies that were introduced from Israel | 12 (32.4%) |
| Traditional knowledge | 1 (2.7%) |

**Table 8.5: Coping with Farming Changes: Needs and Possibilities for Action**

| What are the needs for action to cope with changes? | What are the main constraints to the possibility for action to cope with changes? |
|---|---|
| New crops | Land limitations |
| Open international markets | Market limitations |
| Introduce new income generating activities | Lack of capacity |
| Increase water availability | No support and guidance |
| Water technologies | Not an individual task |
| Need for change | Long term process |

Table 8.6 lists methods that interviewees stated enhanced their farming conditions, including technological solutions to overcome climatic changes and also collective solutions such as committees and other collective action by farmers to strengthen their organizational capacity (notably the farmers' associations created in 2007).

**Table 8.6: Coping with Farming Changes: Methods and Constraints**

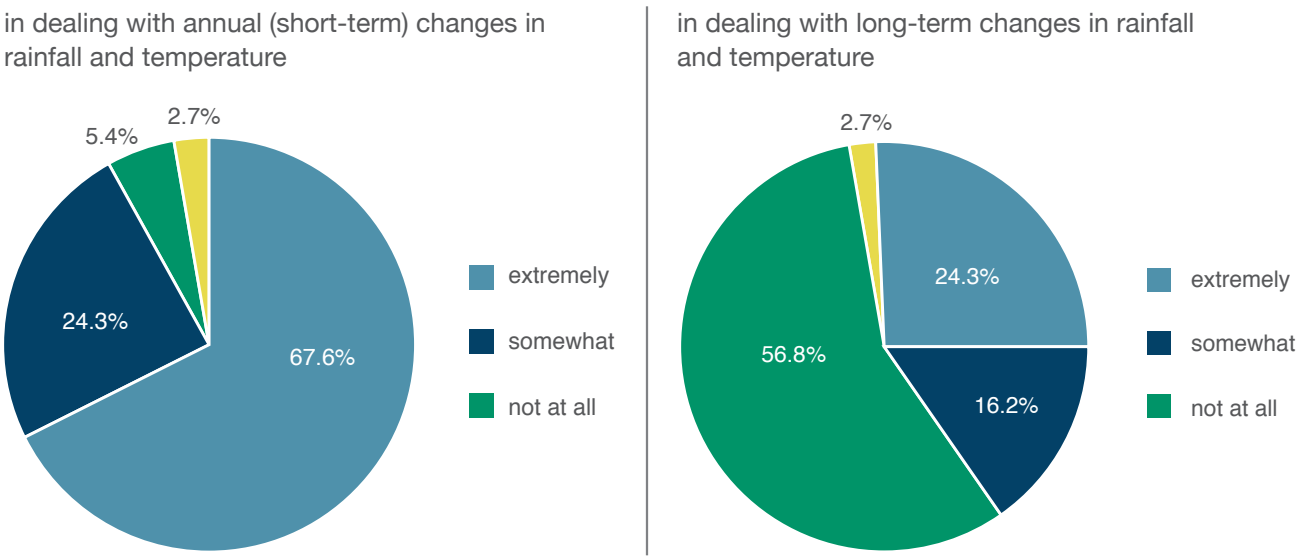
| What are the methods adopted to cope with changes? | What are the main constraints you are faced with? |
|---|---|
| Changing crops | Climate and elevation |
| Enhance soil | Lack of expertise |
| Drip irrigation | Investment |
| Collective solutions | Limited crop variety |
| Drought resistant crops | No research institutes |
| Technological solutions (coolers, monitors) | Marketing constraints |

## Perceived Effectiveness of Climate-Related Coping Practices

Over 90% of the farmers surveyed believed that the practices listed above would be effective over the short-term (next 10 years) in dealing with projected annual changes of reduced rainfall and increased temperatures, but this confidence falls for longer-term climatic effects (just over 40%) when projected rainfall and temperature changes are greater.

*Village of Majdal Shams: water storage tanks still in use to compensate for water cuts*

**Figure 8.3: Perceived Effectiveness of Climate-Related Coping Practices**




## Policy Interventions

In terms of vulnerability of the farming communities in the Golan Heights, security nets available to the individual farmers depend on the existence of local support, societal institutions and governmental bodies. In the survey, all interviewees stated that in case farming losses occur due to environmental changes, support from extended families, religious organizations, NGOs, governmental bodies is almost non-existent today. Support comes mainly from income-generating jobs from household members rather than any institutional support. In addition to that, the agricultural committees established to efficiently manage the water sources in the Golan Heights were mentioned as a support mechanism in case of environmental changes.

Interestingly, with all the limitations and difficulties faced by farmers today in the Golan Heights, 95% state that abandoning land is not an option for them. 84% of the sampled population only generated up to 40% of their income from agricultural practices.

Participation in community-based projects addressing issues of water, land and cultivation was highlighted as important by the sample population. These projects were forums for expertise sharing and learning. The farmers learned from agricultural experts and received technical support and also received more information on how to get governmental grants and establish a lobbying force. The collective action theme was highlighted as benefiting the farmers' community as a whole in order to get organised and work collectively on issues that affect them all. From the questionnaire the respondents stated that any solution to climatic change and the problems it inflicts on farming has to come from the governmental (73% affirmative) and intergovernmental level (59% affirmative). The awareness that climate change and its effects are a global issue exists. Interestingly, the general solutions suggested by the farmers, as illustrated in Figure 8.4, feature both approaches to mitigate as well as adapt to climate change.

**Figure 8.4: Perceived Solutions to Climate Change Impacts on Farming**

# Occupied Golan Heights Focus Group Report

**Figure 8.5: Summary of Questionnaire Results and Focus Group Findings**

| Grouping | Impact | Coping Mechanisms | Adaptive Capacity |
|---|---|---|---|
| Water | • Prevention & demolition of water infrastructure<br>• Allocation –Unequal / Theft<br>• Pricing<br>• Water Pollution<br>• High dependence on Israel agriculture systems | • Rainwater harvesting<br>• Crop selection<br>• Reducing cultivated land<br>• Drip irrigation/ change of irrigation from flooding to drip<br>• Advocacy and campaigning, pressure on Israeli authorities<br>• Introduction of technologies/ computerized systems | • Invest in advancing agricultural technology<br>• Advocacy and exercising pressure on Israeli authorities<br>• Understanding the science of agriculture to develop it<br>• Collective action and communal work<br>• Strengthening local economy and local consumption<br>• Increasing variety of livestock<br>• Increasing awareness |
| Land | • Land-use restrictions<br>• Land confiscation/mines/ military zone/ reserves<br>• Zoning/ permits and licensing of farms<br>• Soil quality (salinity, pests, etc.) | • Crop selection<br>• Crop /livestock reductions & changes<br>• Increased use of pesticides<br>• Agricultural technologies (refrigerators, greenhouses, thermometers)<br>• Change of type of livestock<br>• Land reclamation to avoid confiscation | • Strengthen organic production and biological control<br>• Reducing the use of harmful pesticides/chemicals<br>• Less preventative spraying and more curative spraying<br>• Support local production crop types |
| Socio-economic | • Feelings of insecurity<br>• Israeli market hegemony/ Israeli planning<br>• Government incentives for settlers marketing<br>• Competition of products by settlers<br>• Individual work – the small farmer work | • Farmers Associations<br>• Collective Action (farmers helping each other out, Jordan Valley)<br>• Reduction of production and consumption<br>• Diversification of income generating activities | • Feasibility studies for production and marketing<br>• Solving the inheritance problem which divides the land<br>• Encourage young generations to work in farming<br>• Opening an agricultural college in the Golan Heights<br>• Farmers association to be developed, organized and working strategically<br>• Industry linkage (introducing new products)<br>• Agricultural tourism<br>• Link with international movements and networks (i.e. slow food movement) |

The focus group in the Golan Heights, undertaken on 24 August 2013 in Madjal Shams, consisted of ten members of the community. The age ranged from 30 years to 63. All participants of the focus group were men, two of which identified their main profession as farmers while others professions ranged from media, pharmacy, trade, economist, and employees of local institutions. The main objectives of the study were presented to the participants, emphasizing the main factors of Israeli occupation and climate change and their effects on farming communities in the three research regions, with a summary of the major findings from the questionnaire survey of farmers in the occupied Golan Heights. Three themes structured the focus group discussion on farming vulnerability – water, land and socio-economic factors. Figure 8.5 presents the key conclusions on impacts, coping practices and adaptive capacity.

## Water

In the Golan Heights, the highlighted water issues focused on unequal allocation of water by the Israeli water company (Mekorot), in what was regarded as 'theft'. Additionally, the participants of the focus group highlighted the high dependence on Israel and its agricultural system, weakening the existing agricultural system of the remaining Arab villages of the Golan Heights.

**Water Lobbying**

The farmers associations, created in 2007 to manage water resources efficiently and advocate for higher water allocation for Syrian farmers. The farmers associations are managed by agricultural experts and professionals and have managed to obtain rights to pump water from Lake Ram and other water sources nearby. This has been previously prevented by the Israeli water company (Mekorot). The farmers association therefore is a new tool for farmers in mitigating the impacts of Israeli limitations and also the current agricultural practices which requires ample amounts of water.

Technology development and active lobbying for water allocations and rights were highlighted as the most effective measures to be developed as adaptation strategies. Increasing crop variety, introducing computerised systems for product quality, and enhancing agricultural knowledge were also adaptive actions recommended during the focus group discussion.

**Association for Coolers**

In the occupied Golan Heights, there are 8 large coolers (storage facilities) in Majdal Shams (4), Masada (1), Buqatha (3). These coolers are collectively owned by farmers who invested in the project. The project of building the coolers was initiated by farmers to overcome the drop in apple prices in the market and provide produce around the year. Today, the coolers provide a total storage for 30,000 tons of apples. One of the roles of the association is to encourage local merchants to prioritise the marketing of apples from the occupied Golan Heights.

*Golan Focus Group*

## Land

Land issues in the Golan Heights have a distinctive political character. Israel today, through zoning and land regulations, is limiting the expansion of Arab agricultural land. Cases of land confiscation are rare but the most obvious land control mechanism is zoning and prohibiting the use of agricultural land, according to the Israeli authorities, for security, safety (minefields) and ecological protection (nature reserves). This has impacted agriculture in the region and halted its expansion. Issues of social norms and practices of land inheritance have further divided the agricultural plots and made it less efficient and less profitable to farmers. This was discussed in the focus group and communal land management was suggested as a way to develop agriculture and preserve the land. Additionally, investment in organic agriculture was also recommended.

After the 1967 occupation and the abrupt settlement activity in the occupied Golan Heights, farmers collectively began reclaiming abandoned hilly lands within their control. This has increased the amount of available land for growing fruit trees.

**Land Purchasing in the Golan Heights**

Land owners prohibit the selling of land to any individual that does not belong and be part of the community of the five villages of the Golan Heights. The collective political identity has created these norms and rules to safeguard land grabbing by Israel. Therefore, land has a collective value for the Syrian farmers.

## Socio-Economic Factors

The individual efforts of farmers to stay on the land and continue farming was characterized as 'the small farmer/*falah*'. With limited international marketing opportunities and hegemony of the Israeli agricultural companies, farmers are facing grave economic and social burdens. Feelings of insecurity and continuous threat of residency revocation and land confiscation are driving many residents to pursue other jobs and professions in addition to or alternative to farming. Diversification of professions and careers was seen by the focus group participants as an empowering measure, as it allows farmers the 'luxury' of staying on the land without suffering from the economic burden. The discussion also revolved around the importance of establishing and strengthening agriculture knowledge, through building an agricultural college in the Golan Heights, conducting feasibility studies on developing agricultural products, diversifying crop selection and strengthening local production and economy, stressing the importance of economic planning in a way that reflects the community needs, identity and political situation.

According to focus group participants, due to the geographical and political realities, their connection with the land will remain strong, especially as a source of income and livelihood. Land is seen as an important component of Golani identity, very evidently so during the 1967 war and its aftermath. Today, the Syrian population is being slowly used as labour force in Israel, furthering the estrangement between the people and the land. Land dispossession has also been evident in zoning and building plans, where expansion of building was only allowed vertically, allowing the Israeli state to gain control over unused and uncultivated land. The Israeli policy is that of limiting sovereignty of Syrian farmers over their natural

resources, reducing the independency of the Syrian population in agriculture. Today, Israeli authorities are in control of all water resources essential for irrigation, and therefore the vulnerability of the farmers is perceived as acute. Israeli occupational practices are seen as associated with a high level of coercion.

### Culture and Identity

The focus group participants stressed the social bonds deriving from the land– from a political/economical/social point of view, heightened by their communities' isolation from the rest of the world. Today financial responsibilities and the economic costs burdening farmers are seen as encouraging younger generations to abandon the land. The identity was represented as 'Syrian Arab' – an identity strengthened through attachment and 'steadfastness' (*sumud*) on the land. This identity is seen as challenged by political turmoil and also globalisation. There was a concern relayed over whether the new generation will maintain its 'Syrian Arab' identity due to the current situation in Syria.

The Golan Heights Syrian inhabitants' identity today has been reshaped after decades of dis-attachment from Syria and being under occupation. Staying on the land and belonging to it has been an agreed definition between the participants. As one participant highlighted, 'Outside of Golan we have no identity'. The notion stated was that of belonging to 'humanity' rather than a nation. Remnants of a society torn by forced expulsion; identity preservation becomes a need in light of existential threat by the occupation. The Golan villages have formed a new society (forced) in terms of facilities, labor market, economics (language, culture) that in its core has identity as awareness beyond national and ethnic borders. Another participant stated that: 'We are a community shattered in our values due to abandoning the simple traditional farmers' life and not really reaching the modern urban lifestyle and mentality, therefore being at loss'.

**'Pre-Nation State' Collective Action**

In 1943, local residents of Majdal Shams constructed water channels from Ein El Tufaha spring to houses of Majdal Shams and also constructed a sabeel (public tap) for people who did not benefit from the project due to lack of money. This was before the independence of Syria, during the French mandate. In the years between 1955 and 1967, residents collectively constructed water channels on Al Marj agricultural land.

Also, participants discussed that there is a sense of an emerging post-nationalist identity and a strong return to sectarianism (religious or tribal). This is an indicator of the social fragility of the Syrian Arab communities of the occupied Golan Heights. However, land remains key to collective identity. Today, it is still considered inconceivable to buy land or be 'landless' as this will further alienate the individual from belonging to the community. Israeli education systems and curriculum are not seen as helping as they are designed to erode the Arab identity and establish a new sectarian identity for the Druze.

The identity spirit was highest during annexation and the forced citizenship which the Golan Heights residents refused. Attachment to the land is citizenship issue for the Golan Heights. In the 1950s, the inhabitants of the Syrian land began using modern agricultural techniques. Before 1950 and the establishment of a Syrian state and the introduction of modern agriculture, Majdal Shams residents relied on collective work and a more organic relationship with the land.

Israel, in its annexation of the Golan Heights, was seen by the focus group as creating facts on the ground that negatively impacts the Syrian inhabitants of the Golan Heights and weakening their farming practices. With its settlement buildings and transfer of its citizens to occupied land and the illegal use of its natural resources, Israel is breaching

international law. In addition, the Israeli authorities are limiting the use of space, whether to meet the natural expansion of the villages' population or the use of land for agriculture.

Israeli occupation was seen as working on two levels; on one level it is working on bettering its image to the international community. Second, the occupation was seen as targeting the economic destruction of the Syrian inhabitants' agriculture. Today, agricultural settlements are granted large amounts of land and water to grow apples and cherry while local Syrian farmers are marginalised and disempowered. When the Syrian Arab farmers collectively arranged the collection of rainwater and assisted farmers with the move from rain-fed to irrigated techniques, the Israeli authority proposed water purchasing of water to the Syrian farmers. Therefore, profit was being made by the authority as a first priority and not the actual development of the agricultural sector in the Golan Heights. Additionally, this has increased the stress on the new generation to stay in farming, as it has become economically not feasible.

### Communal Resilience

The Syrian inhabitants of the Golan Heights have a long history of communal activism in managing and sustaining their communities. Since the occupation, this has been severely weakened in agriculture, economy and social structures. Nevertheless, the cases presented in the focus group discussion emphasized the crucial aspect of communal work. Communal and collective work was identified as the most effective measure of sustaining a viable community that is facing isolation, neglect and systematic weakening. Although the participants believed that many measures of mitigation and adaptation must be done within an overarching governmental involvement and investment, it was stated that all community members must be involved in planning, executing and maintaining.

The efforts of the Syrian communities should, it was argued, be invested to reduce the dependency on Israel through adaptation measures decided on locally and collectively. The need to strengthen diversification of role and use of land is a collective endeavour to make agriculture in the occupied Golan Heights a profitable venture.

Farmers associations have been praised as a strategy to preserve the land and the interest in staying on it and cultivate it for future generations. The farmers' association role is focused on mobilising the residents of the Golan Heights to negotiate and put pressure on the Israeli authorities in charge of water supply and marketing. Donor aid involvement was also highlighted as a factor for preserving the local bonds and communal work but also as potentially weakening community development due to lack of a structured vision. The lack of international community presence in the Golan was highlighted as a contributor to Israel not respecting the economic, political and human rights of the Syrian farmers.

Identity is seen a driving force for enhancing the resilience of the community, as land ownership and farming is seen both as an investment for increasing the value of the land and even more a key symbolic resource for identity and belonging of the Syrian population in the occupied Golan Heights.

# Southern Lebanon: Vulnerability and Adaptive Capacity Assessment

Mohammed Khawlie (lead author) and Michael Mason

The Lebanese scoping survey (504 responses) and project-wide questionnaire survey (296 responses) both addressed determinants of vulnerability and adaptive capacity in the Hasbani study area. Both surveys considered climate vulnerability across the three regional districts of the Hasbani Basin - Hasbaya, Merjayoun, Rachaya, although the scoping survey covered urban and rural settlements while the project-wide survey focused on farming households in rural communities. As with the other study areas, a focus group was conducted to discuss the major findings from the main survey and explore in detail the implications of (post)occupation on rural livelihoods and communities.

## Determinants of Climate Vulnerability

### Biophysical Determinants

In the scoping survey only 35% of respondents claimed to have knowledge about climate change and, when questioned about the principal sources of water scarcity, less than 1% attributed this to environmental variability. For the project-wide rural survey, there was a much greater awareness of climate change. Over at least the past ten years, 97% of respondents had noticed increasing mean temperatures, although responses to annual mean rainfall changes were much less clear-cut: 37% of respondents had noticed a decrease in mean rainfall, but 51% reported an increase. More than half the sampled farming households reported no significant change in runoff or spring flow, though almost a quarter noted a *decrease* in runoff (24.7%) and spring flow (22%). Of observed changes in temperature and rain, 88% respondents attributed these to climate change rather than climate variability. Over three quarters (77.7%) of the respondents stated that experienced climate changes (above all the temperature increase) had *not* had an effect on their agricultural production, with a minority reporting either a moderate (12.2%) or extreme (1%) negative effect.

### Conflict-Related Determinants

In the scoping survey (in which just over 10% of respondents had agriculture-related employment), most respondents reported that the Israeli occupation had either moderately (51.2%) or badly (19%) affected their economic livelihoods, although bodily and health-related insecurity was seen as far more stressful than economic insecurity. As revealed by the survey, the inhabitants of southern Lebanon experience a (post)occupation setting of political instability and human insecurity. Despite the 2000 withdrawal of the Israeli army and the UN-brokered ceasefire to the 2006 Israeli-Lebanese war, conflict-related threats are ongoing (see Chapter 6 above). Regular Israeli surveillance and military incursions into southern Lebanese territory, described by the respondents as outside intervention or military interference (‘*tadakhol*’), take place even though UNIFIL forces are charged with confirming the withdrawal of Israeli forces and assisting the Government of Lebanon to exercise its effective authority in the area. In a scoping survey question on damage attributed to the 1978-2000 occupation regime, direct damage to water infrastructure was seen as significant by 13% of the sampled population, although the harm directly inflicted on people was regarded as more serious (73% respondents).

The project-wide survey in southern Lebanon addressed the impacts on farming households of Israeli military actions up to the present day. Reflecting the findings of the scoping survey, just over half the respondents (50.7%) stated that the main impact of Israeli military actions (past and present) was on lives rather than farming livelihoods; in particular, the social instability, fear and personal/family insecurity resulting from conflict-related conditions. Over a quarter did identify effects on farming livelihoods as the main impact of Israeli military actions, whether as a result of production losses (21.6%), damage to ecosystem services (4.1%), and lack of access to lands because of military barriers and installations (2.7%).

In a question asking respondents to state the years in which farming production was damaged by war conditions (encompassing all belligerents), 58% respondents reported damage in 1982 (when Israel invaded southern Lebanon) and 22% reported damage during 2006 (Israel-Lebanon conflict). In no other years was *direct* damage noted as significant, although productive farming capacity was significantly weakened during the military occupation and following the 2006 war. And, according to the survey, ongoing threats of Israeli military action still significantly impact on the agricultural decision-making of farmers in the Hasbani Basin.

From questions on water availability (covering both domestic and economic use) in the scoping survey, a third (32.5%) of respondents stated that the main cause of their vulnerability to water scarcity was Israeli (post)occupational practices. Interestingly, a greater proportion of 36.5% stated that their water vulnerability was mainly a result of domestic operational failings in water allocation and distribution. This figure likely reflects perceptions of urban dwellers on water allocation and management failings. In the project-wide questionnaire survey applied exclusively to rural communities, 57% of respondents attributed decreasing water availability to the direct and indirect effects of Israeli (post)occupational practices.

Almost all the sampled population of rural households depend on rain for their agricultural water needs, but find this is not enough: the most important supplementary sources are (in decreasing order of significance) water purchased from tankers, municipal supplied water, spring water, reservoirs and private wells. Poorer farmers are more dependent on water supplies from tankers and springs. The threat and use of military force by Israel is seen to relate directly to the control of water resources in the region. Lebanese extraction of water from the Hasbani Basin was reduced during the occupation then increased following the 2000 Israeli withdrawal, partly as a result of a new pumping station at the Wazzani springs near Ghajar. Designed for local domestic consumption, this pumping station was declared by Israel to be a direct threat to its security and was subsequently damaged by Israeli forces during the 2006 war. To avoid confrontation with Israel, the Lebanese government put on hold further water pumping plans in the region (UN-ESCWA and BGR 2013: 195; Zeitoun et al. 2013: 95). The respondents to the main survey reported that they do not drill for water near the border (no nearer than 15 km in some locations) because of a perceived threat of Israeli military action against any new water infrastructure.

*Upper Hasbani: oleander in dry river bed*

## Adaptive Capacity

The project-wide survey of rural households revealed the independent, small-scale nature of farming in the Hasbani Basin. Of the 294 respondents, most described themselves as the land owner (90.5%) or co-owner (5.1%), with only self-reported as tenant farmers (3.7%) or co-tenants (7%); and most landholdings were reported as small - 56.8% from 1-4 dunums and 36.8% from 6-15 dunums. Only 7% were greater than 50 dunums. On average, households had five family members, 30 years' farming experience and had one additional individual to work on the land. Most farming households followed multi-cultivation with a preference for fruit crops - cherries, apples and bananas - and also significant production of flowers. Just over half (52%) of respondents judged their economic conditions to be improving over the last 20 years, while three-quarters (75%) also stated that conditions had improved over the last 10 years, i.e. since the 2006 war.

Although the economic conditions for farming were judged to be improving since the occupation and most recent conflict, most of the Lebanese farmers surveyed stated that climate change (88%) and Israeli military/security practices (57%) were responsible for negative impacts on water requirements for agriculture (including climate-induced higher crop water requirements from increasing temperatures). As noted above, over three-quarters (78%) of respondents did not think that these changing environmental conditions had yet had a significant effect on their production. Yet, as shown below in Table 9.1, 95% of farmers still felt that there was a need for immediate action to cope with these environmental challenges. Table 9.1 lists the suggestions made, of which the most popular is government support for the agricultural sector.

**Table 9.1: Perceived Need for Coping Action and Suggested Policy Responses**

Do you think there is a need for action to be taken to cope with these changes?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 0 | 13 | 4.4 | 4.4 | 4.4 |
| | Yes | 282 | 95.3 | 95.3 | 99.7 |
| | No | 1 | 0.3 | 0.3 | 100.0 |
| | **Total** | **296** | **100.0** | **100.0** | |

If yes, elaborate:

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 17 | 5.7 | 5.7 | 5.7 |
| | Dams and improving water | 41 | 13.9 | 13.9 | 19.6 |
| | Government supporting agriculture sector and enacting relevant legislation | 143 | 48.3 | 48.3 | 67.9 |
| | Adaptation to climate change | 2 | 0.7 | 0.7 | 68.6 |
| | Control pollution | 59 | 19.9 | 19.9 | 88.5 |
| | Secure stability and operational needs (fuel, electricity etc…) | 27 | 9.1 | 9.1 | 97.6 |
| | Land reclamation | 4 | 1.4 | 1.4 | 99.0 |
| | Agricultural advice and NGOs help (including agri-syndicate) | 3 | 1.0 | 1.0 | 100.0 |
| | **Total** | **296** | **100.0** | **100.0** | |

Table 9.2 summarises the existing practices already utilised by the farming households to cope with changing environmental conditions: the most popular are rainwater harvesting (70.3%), changing crop selection (20.3%) and greenhouse cultivation (17.9%) and changing irrigation type (10.5%).

On the specific question of (longer-term) adaptation to climate change (Table 9.3), almost two-thirds of survey respondents favoured land reclamation, suggesting a perception of a significant amount of rural land unavailable or otherwise not used. The extent to which security-related reasons (e.g. threats of Israeli action, closed areas due to minefields) inform this perception of non-use was explored in the later focus group (see 9.3 below).

16% of respondents proposed improving and supporting irrigation infrastructure as the only explicit adaptation option for increasing water availability. It is also noteworthy that government support (8.1%) is less important as a source of climate adaptation than with the coping action suggestions listed in Table 9.1.

**Table 9.2: Use of Coping Practices by Farming Households**

Assess the extent to which you utilise the following pratices:

| | Always | Frequently | Sometimes | Rarely | Never | Missing System |
|---|---|---|---|---|---|---|
| Rainwater harvesting | 208 | 72 | 14 | 2 | 0 | 0 |
| % | 70.3 | 24.3 | 4.7 | 0.7 | 0.0 | 0.0 |
| Changing crop selection (seasonal shifwt) | 60 | 159 | 67 | 7 | 3 | 0 |
| % | 20.3 | 53.7 | 22.6 | 2.4 | 1.0 | 0.0 |
| Changing of crop to livestock or vice versa | 36 | 88 | 131 | 30 | 11 | 0 |
| % | 12.2 | 29.7 | 44.3 | 10.1 | 3.7 | 0.0 |
| Reducing number of livestock | 30 | 95 | 115 | 47 | 9 | 0 |
| % | 10.1 | 32.1 | 38.9 | 15.9 | 3.0 | 0.0 |
| Greenhouse cultivation | 53 | 86 | 60 | 49 | 48 | 0 |
| % | 17.9 | 29.1 | 20.3 | 16.6 | 16.2 | 0.0 |
| Changing type of irri-gation | 47 | 96 | 88 | 48 | 17 | 0 |
| % | 15.9 | 32.4 | 29.7 | 16.2 | 5.7 | 0.0 |
| Increasing amount of irrigation | 31 | 125 | 73 | 52 | 15 | 0 |
| % | 10.5 | 42.2 | 24.7 | 17.6 | 5.1 | 0.0 |

Regression analysis of the Lebanese data showed perceived changes in mean temperature as the most likely environmental determinant for the adoption of coping practices (notably greenhouse cultivation, reduced number of livestock, buying insurance and the use of remittances from family members). Physical damage to agricultural assets from (post)occupational measures – military and security practices – significantly reduces the propensity to adopt most coping practices (greenhouse cultivation, irrigation, buying of insurance) aside from rainwater harvesting, livestock reduction and the abandonment of land. The latter can be seen as 'passive' or defensive coping. Economic losses as a result of Israeli military and security actions also hamper the adoption of coping practices, but less so than direct physical damage to farming assets. This suggests that, as long as farming assets remain intact, farmers can adopt coping strategies to reduced water availability for agriculture.

**Table 9.3: Proposed Climate Change Adaptation Measures**

What type of solutions would you propose to address climate change and the problems it has lead to or may lead to in the future?

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 4 | 1.4 | 1.4 | 1.4 |
| | Government support social stability and africultural sctor | 24 | 8.1 | 8.1 | 9.5 |
| | Improve and support irrigation water sources, agricultural roads and operational needs (electricity, fuel etc…) | 47 | 15.9 | 15.9 | 25.3 |
| | Environmental approaches including green cover to face climate change | 10 | 3.4 | 3.4 | 28.7 |
| | Financial needs, materials and securing market | 19 | 6.4 | 6.4 | 35.1 |
| | Agricultural land, reclamation and support farmers' needs | 189 | 63.9 | 63.9 | 99.0 |
| | Effective, fair policies | 3 | 1.0 | 1.0 | 100.0 |
| | **Total** | **296** | **100.0** | **100.0** | |

## South Lebanon Focus Group

The focus group workshop was held on September 27, 2013, at the Snoubra Hotel in a pine forest overlooking Hasbaya, South Lebanon. The discussion was attended by 23 participants from Hasbani Basin towns and villages, including farmers, members from municipal councils, professionals, rural cooperatives, and women. It was moderated by Dr Mounir Mhanna and Dr Safa Baydoun from Beirut Arab University.

### Discussion of Questionnaire Results

The participants believed the survey covered the most significant aspects of biophysical and occupation-related vulnerabilities to farmers. Coverage of the coping mechanisms was stated to be comprehensive, but the missed emigration as a coping practice. Most participants agreed with the results on adaptation: some thought more emphasis should have been given to the drilled water wells. Others questioned the survey result that as many as a third (32%) of farmers had converted from agriculture to cattle herding.

On the role of government, the focus group participants found the survey results valid, but stated that there should have been more stress on awareness to reduce emigration among the youth, as well as an increased role of marketing to support the farmers.

*Southern Lebanese Focus Group*

### Options for Strengthening Adaptive Capacity

#### Water

All participants agreed that there are water-related stresses on their agricultural livelihoods, and that their water availability may be affected by climate change (which they cannot quantify). Key measures to strengthen adaptive capacity related to water availability were proposed as:

- Water harvesting > changing crops to better suit less water-demanding crops through different seasons > reducing agro operations and diversifying income sources > changing to more efficient irrigation (e.g. drip irrigation);
- Moving to cattle herding from cultivated crops, though some focus group participants did not support this;
- Spreading of knowledge to help farmers decide on best options, including greenhouse agriculture.

#### Land

According to the focus group participants, lands close to the Israeli border are now constantly under threat of intervention (even under UNIFIL presence) which makes them worthless, and once abandoned, leads to land degradation. Lands close to or at water sources of Hasbani/Wazzani are also under constant monitoring by Israelis as any Lebanese operation (surface or subsurface) is taken to affect water quality for Israel. This security-related constraint on water extraction and/or distribution is seen as additional to any impact due to climate change.

Key measures to strengthen adaptive capacity related to land availability were seen as heavily constrained by the practice and threat of Israeli interventions. For example, converting to cattle herding is not seen as an efficient solution in the face of Israeli intervention and the degradation of abandoned lands. As long as political conditions remain the same, the main coping strategy is negative; that is, trying to avoid using those lands prone to Israeli intervention. If political conditions improve, feasible adaptive options include:

- Changing crops to reduce water consumption and increase drought resistance;
- Using technology to increase production, including the controlled use of pesticides (their increasing use is likely in the face of climate change);
- Improving awareness and know-how of other procedures (e.g. production & preservation technology, climate monitoring, soil erosion control);
- Improving current land-use planning and policies.

### Socio-economic

The demographic pyramid in the Hasbani Basin is a young, broad-based one with 31.4% under 18. The region witnessed an upheaval in social growth after the Israeli withdrawal from Lebanon in 2000. But this development also led to some far-reaching social changes, including: increasing urbanization; increasing youth independence with a growing incidence of nuclear rather than extended families; a general decrease in family fertility; an employment shift from the agricultural sector (though still dominant) towards services; increasing education of women; and increasing general services (health, education, banking); and an increasing cost of living.

In relation to socio-economic challenges, the focus group recommended:

- Improving agro market access and outlets;
- Organizing socio-economic services to reach all equally;
- Financial support to stabilise family livelihoods in the face of Israeli military and security practices;
- Strengthening the work of associations, syndicates and NGOs as 'pressure groups' to improve the agricultural sector and farmers capacities;
- Enhancing agricultural policies while advancing focused economic plans supporting the socio-economic status of farmers.

## The Violence of (Post)Occupation

According to the focus group, the area has long history of hardships related to Israeli military practices: the annexation of the Chebaa Farms in the 1950's (a set of agricultural settlements adjacent to Chebaa town); the prevention of the local community from fully benefitting from of the Hasbani-Wazzani waters; the occupation of parts of the region from 1967 (Ghajar and KfarShouba Hills); total occupation from the 1988 until 2000; and partial occupation since 2000 until the present. These are seen as direct impacts of the aggression of occupation which affect the community's daily physical operations. But there are also indirect effects which are more long-term – the creation of fear, insecurity and the absence of social stability – through the cumulative effect of repeated conflict episodes and military interventions. Many farming households were up-rooted them from their lands, leading them to abandon their farms.

During the Israeli occupation of the area, the Israeli military treated the people differently according to their passivity or resistance. Those on the passive side were sometimes even allowed to work on Israeli lands and gain new knowledge in agro practices. Yet, at the same time, this caused internal social divisions amongst the population in southern Lebanon, which have persisted since 2000.

After liberation the community did not feel the 'generosity' of the Lebanese Government, as the Government did not have enough financial and capacity resources to assist. Nevertheless, the return of a large number of people to their villages and towns was encouraged by moral attachment to the land, to their family roots, and by the private sector. The latter is playing a crucial role in the re-development now taking place there. But in those zones adjacent to the borders, a general feeling of insecurity remains.

The focus group summarised the main conflict-related impacts over the past 20-30 years as:

- Abandonment and degradation of agricultural land;
- Some community members have gained knowledge of new technology;
- Almost total absence of the Lebanese Government, though the rise of strong political parties;
- Driving the youth to work with reduced of education;
- Decrease in agro-diversity and planted areas;
- Decrease in agro-professionals and working labor;
- Lands falling in the hands of 'feudal lords', preventing agricultural exploitation.

The main Israeli military-security practices that have continued since 2000 are:

- Shelling, bombarding, sniping, kidnapping and general 'no-peace' conditions;
- A general absence of stability, security, in addition to daily barriers and check points;
- Daily operational practices imposing feelings of fear, leading to emigration.

For the focus group, this more recent 'partial occupation' continues to negatively affect farming livelihoods, through:

- Barriers, check points, interventions … reduced daily agro practices and reduced market access;
- Feelings of insecurity and fear prevented farmer attending his agro practices, therefore abandoning land and its degradation;
- Israeli interference in water exploitation, continuing to oppose development projects affecting/utilizing the Hasbani/Wazzani water sources;
- Declining water quality for the agricultural sector (minimal effects were noted in water quantities, though any such reductions are masked by the general decline in the agricultural sector, the general abundance of the area with water, and minimal community monitoring of water levels in the Hasbani watershed).

## Culture and Identity

The participants in the focus group discussed their valuation of land, agricultural practices and what it means, culturally, for farmers to stay on their lands. In response to the question 'why remain on the land?' they noted:

- Clinging to national identity and challenging the occupation;
- Clinging to land as an existential entity;
- Clinging to Arab identity;
- A challenge to forces for emigration.

And the choice of farming livelihoods was attributed to:

- Shortage of other livelihood choices;
- Limited financial resources;
- The identity-bestowing nature of the land;
- Agricultural practices as an inherent part of rural culture;
- Feelings of socio-economic security from land ownership;
- Cultural communal identity in practicing agriculture;
- The agricultural culture inherently clings to the land.

Israeli security and military practices were seen to intensify this cultural valuation of the land and its identity-bestowing character, prompting:

- A stronger clinging to national identity;
- Creation of a spirit of resistance making defending the land a patriotic must by itself.

Resistance therefore was associated with clinging to rural livelihoods:

- By a commitment to land development, securing daily living needs and maintaining the land, especially as a community;
- By carrying to focus on agricultural practice;
- By staying on the land (not emigrating, even to get higher education).

As discussed by focus group participants, there was a gendered pattern to this commitment to rural livelihoods. Women's agricultural roles are seen as essential, because women constitute a high proportion of the working labour and contribute to family income. Although sometimes this agricultural work is exploitative of women, it is more generally seen as strengthening their social position from its social and economic value.

For the focus group participants, climate change was seen as a less important constraint of farming livelihoods than (post)occupation, because it is not noticed in a direct way, and therefore, as yet, is not a major concern. Where it is slightly noticed, some participants believed that 'nature' itself will adapt. However, there was agreement with the survey findings that government should do more to assist farming households adapt to projected climate-related stresses to agricultural production, notably by supporting marketing access, improving awareness of climate change and its potential impacts, improving agricultural extension activities and implementing other policies that would reduce the water–related vulnerability of agricultural communities.

# Conclusions

## Key Findings

This study investigates the climate-related vulnerabilities of agricultural communities in (post)occupation environments. Following the IPCC (2012: 5), *vulnerability* is understood as the propensity or predisposition to be adversely affected by hazards or stresses, where climatic stresses are mediated by social vulnerabilities. Military occupation by foreign armed forces comprises an exceptional but under-researched condition of social vulnerability to climate-related stresses. We define *(post)occupation* as areas with current or historically recent experience of military occupation. The three study areas reflect distinct stages of occupational control within the same regional watershed (Jordan Basin). They encompass: protracted military occupation (West Bank), annexation (Golan Heights) and post-occupation (southern Lebanon). That the coercive control regime for all three areas is, or was, administered by the Israeli state (military or civil administration) creates a governance linkage for comparative analysis.

While each of the three areas has distinctive characteristics, this conclusion highlights key findings on climate vulnerability and rural livelihood choices under (post)occupation. These are related to the three research aims of the project.

### 1. To identify the main determinants of climate vulnerability for selected rural communities under (post)occupation

Across the three study areas, farmers' perceptions within the past 10-20 years of reduced water availability, increased annual mean temperatures and a delayed rainy season corroborate scientific identification of a regional drying trend. This trend is broadly consistent with scientific projections of climate change for the Jordan Basin, which focus on a northwards shift of the Mediterranean storm track, reducing annual precipitation. In the Golan Heights and southern Lebanon, the drying trend was associated with rising temperatures and variable, rather than reduced, precipitation. However, in the Jordan Rift Valley/West Bank over 90% of surveyed farmers reported a decrease in average participation of more than half over the past decade. Climate-driven water stresses are potentially greatest here given that most agriculture is rainfed-dependent: the climatic viability of rainfed agriculture in the Jordan Rift Valley is threatened, during the course of this century, by the projected northwards retreat of the 200mm isohyet – the approximate 'limit' for rainfed agriculture (Evans 2009: 428-30; World Bank 2012: 70-71)

However, climate stresses are perceived by farmers to be less important than (post)occupational conditions in determining water availability. Israeli state practices are seen as harmful to farming livelihoods, e.g. prohibition and demolition of water infrastructure, land confiscation and/or restrictions, exclusive incentives to Israeli settlers, barriers to markets). Significantly, this holds even for contexts where Israeli military authority no longer has formal effective control - the move to Israeli civilian administration in 1981 in the Golan Heights and the withdrawal of Israeli forces from southern Lebanon in 2000. In both cases significant water supply constraints are attributed to Israeli control or influence, whether as a result of legal rules (Golan Heights) of the threatened use of force across a border (southern Lebanon). This suggests a continuum of (post)occupational practices that escapes the legally self-contained idea of occupation – effective control of a foreign territory by a hostile armed force (Hague Regulations 1907, Article 42) – contained in international humanitarian law (e.g. Benvenisti 2013).

### 2. To survey mechanisms for coping with differential water availability

Over the past two to three decades across the study areas, common coping practices by farmers to differential water availability are: more rainwater harvesting, selection of drought-resistant crop types (e.g. from citrus plants to dates), reductions in livestock or cultivated land, and switching from flood to drip irrigation.

Rainwater harvesting is a preferred, low-cost coping practice in the three study areas, but its increased use is prohibited by the Israeli government both in the occupied Golan Heights and the Jordan Rift Valley (in Area C). There is more scope for changing crop selection. In the Jordan Rift Valley there has been a major reduction in the Arab production of thirsty crops (e.g. bananas, watermelon and citrus crops) and the loss of a summer season for crops now cultivated only in the winter season (e.g. eggplants, cauliflower and green peas). Similar crop changes and reduced production were also reported in the Golan Heights and, to a lesser extent, southern Lebanon (where physical water stresses are less pronounced). Both areas favour fruit production, though with greater monocultural cultivation in the Golan Heights.

The move to drip irrigation in the occupied Golan Heights began after Israel took over in 1967, with over 80% of farming households surveyed reporting a switch from flood to drip irrigation over the past 5-35 years. Drip irrigation was judged to be one of the most effective coping mechanisms by West Bank farmers in the Jordan Rift Valley, though reduced water quantity and quality mean that sometimes even drip irrigation cannot meet agricultural needs, and the cultivated area is therefore reduced. Changing irrigation type was less important to farming households in southern Lebanon (just over 10% cited this as a coping action), though post-occupation damage to agricultural assets is a seen as significantly reducing the propensity to switch irrigation type.

Temporary or permanent migration is an important coping practice in the Jordan Rift Valley and southern Lebanon, but difficult to quantify. In the Jordan Rift Valley, for example, farmers from Al Jiftlik and Al Auja have moved to less water-stressed Palestinian areas to continue agriculture and also become wage labourers in Israeli settlements. By subjecting Palestinian farmers to wage labour, the economic feasibility and legitimacy of occupation is deepened. According to the southern Lebanese focus group, forced migration of farming households is a significant coping practice, but there are no precise statistics on these population movements: existing estimates in rural areas are rendered more uncertain by the recent, substantial inflow of refugees from Syria.

### 3. To assess the adaptive implications of farming livelihood strategies and rural livelihood choices under conditions of '(post)occupation'

The questionnaire survey and focus groups distinguished between short-term coping and long-term adaptation measures in the context of differential water availability under conditions of (post)occupation. Are current farming livelihood strategies and practices equipped to address additional climate stresses in the future?

Across the three study areas, existing *independent farmers' associations* are judged the most effective means for improving the capacity or farmers to adapt to continuing water-related stresses (e.g. the '*sharaka*' partnership system in the West Bank, the collective-owned coolers for storing apples in the Golan Heights). This finding is not surprising in the context of a lack of support from governmental organisations, which are typically seen either as weak (Lebanese government and Palestinian Authority) or hostile (State of Israel). Collective action over shared agricultural claims is thus an act of self-determination within a domain of contested sovereign authority.

As recommended by the regional focus groups, proposed adaptation measures across the three study areas vary according to distinctive governance conditions. Each of the focus groups highlighted better governmental support for farmers, encompassing technical, economic and land supply concerns. *Existing coping practices are generally seen as templates for adaptation subject to governmental support for their scaling up in response to future climate-related stresses.* Yet in each area Israeli security and military practices are perceived to be the main obstacle to institutional strengthening of the farming sector: the maintenance and development of farming livelihoods is severely hampered by exceptional governance practices which systematically discriminate against the affected Arab/Druze communities. Even if the threat of use of force is rarely exercised, the securitisation of land and water resources in the three areas undermines agricultural development. This is most obvious in the occupied Golan Heights and Jordan Rift Valley, where intensifying and creeping annexation in under way; but the pervasive risk of violence faced by Lebanese farmers in the south-eastern borderlands of the Hasbani Basin is as debilitating for agricultural livelihoods.

Under conditions of (post)occupation, farming livelihoods in the three study areas are self-represented as oppositional to Israeli authority and influence, suggesting *shared social identity as a source of livelihood resilience.* Farming acquires political subjectivity as 'staying on the land', whether celebrating the small farmer *(falah)* in the occupied Golan Heights or 'striving forward' *(jihad)* in the Jordan Rift Valley. Both in the West Bank and Golan case studies, a common referent in the field survey and focus groups was the concept of *sumud* ('steadfastness') developed first in a Palestinian political context as a non-violent response to Israeli military-occupational practices. Moral attachment to the land therefore underpins livelihood choices that may be judged by third parties as economically 'irrational' but, from a participant perspective, are necessary for political resistance to a sovereign actor perceived as hostile.

### Finding on hypothesis

The working hypothesis informing the study is that:

*The coping mechanisms used by farming households exposed to differential water availability under (post)occupation negatively affect their capacity to adapt to additional climate stresses.*

This hypothesis is falsified in the sense that current coping mechanisms *by themselves* do not negatively affect the capacity of farmers to adapt to additional climate stresses. In fact, the main coping strategies by farmers in the three study areas generally *enhance* the capacity to adapt to enduring climate stresses (e.g. growing use if drip irrigation in the Golan Heights and West Bank; shift to olive trees in the Hasbani Basin, southern Lebanon). However, (post)occupational practices associated with Israeli military-security actors are seen by Arab farmers as negatively affecting their capacity to adapt to these added biophysical stresses. A qualified version of the hypothesis, treating (post)occupation as the independent variable, is supported by the research; that is: *(post)occupation negatively affects the capacity of farmers to adapt to climate stresses.* However, this hypothesis would need to be systematically examined more directly.

## Policy Implications

In its contribution to the Fifth Assessment Report of the IPCC, Working Group II (Impacts, Adaptation and Vulnerability) identifies, for poorer farmers in semi-arid regions, a high risk of loss of rural livelihoods and income in coming decades due to insufficient water availability and reduced agricultural productivity (IPCC 2014: 12). At the same time it recognises that there are large uncertainties about future vulnerability to climate change in the light of complex interactions between human and natural systems. Effective adaptation to climate change is seen as context specific, with decision-makers encouraged first to focus on reducing vulnerability and exposure to prevent climate vulnerability (IPCC 2014: 22).

The research findings of this project reveal high vulnerability to the differential availability and quality of agricultural water: the sustainability of rural livelihoods in all three study areas is threatened by the lack of predictable and/or affordable access to sufficient water. A significant part of this differential water availability can be attributed to climate stresses. As noted above, the drying trend over the past two decades reported by most of the surveyed farmers accords with climate observations and is projected by climate scientists to continue. Whether or not increased temperatures and more variable/reduced participation are the result of climate variability or change, communities across the Jordan Basin faced particularly dry conditions over the 2013-14 winter season: UNICEF forecast an impending drought for Lebanon, Jordan and Syria, intensified in its effects by massive population displacement and social disruption as a result of the conflict in Syria (UNICEF 2014). A focus on current climate stresses can nevertheless displace attention from long-term demographic growth and urbanisation in the Jordan Basin. According to a recent inventory of regional water sources, the intensification of water use from socio-economic development may outweigh any effects caused by climate change (ESCWA-BGR Cooperation Project 2013: 213). Thus far, there is insufficient collection and dissemination of water resource use data to allow confident assessments of the factors driving changes in water availability and quality across the Jordan Basin. Given the political sensitivity of much national data on water use, *basin-wide scientific coordination on the collection and analysis of regional meteorological and hydrological information can facilitate technical improvements in assessing shared (climatic and non-climatic) impacts on water resources.*

Across the three study areas in the Jordan Basin, this research project highlighted the multiple means by which farmers, who choose to stay on the land, are coping with differential water availability. Some of these coping strategies (e.g. selection of drought-resistance crop types and a shift to drip irrigation) already reflect adaptive responses to enduring reductions in water availability, indicating some resilience in the face of climate-related water stresses. However, *the physical scarcity and/or poor quality of agricultural water in the study areas is, according to those surveyed, caused above all by conditions of (post)occupation.* Through the empirical lens of this study, (post) occupation describes a state of exceptional governance in which either: (i) the sovereign actor (Israel), as occupying power, systematically discriminates against Arab/Druze farmers concerning the allocation and management of agricultural water (West Bank, occupied Golan Heights); or (ii) a weak sovereign actor (Lebanon), unable to control the means of violence within its southern borderlands, struggles effectively to manage or develop agricultural water resources (Hasbani Basin). Policy recommendations for 'good water governance' blind to these geopolitical realities are of little practical use, especially those increasing dependence on state entities. *Internal and external support for institutional strengthening in water management is best targeted at supporting the independent farmers' associations which, in each of the study areas, have developed*

*autonomous, bottom-up capacity for adapting to differential water availability.* Such support could encompass not only requested technical and financial assistance, but also strengthening the legal infrastructure of these civil society organisations in the midst of difficult, even hostile, governance environments.

The international community has a dismal record addressing the (post)occupational roots of differential water availability in the Jordan Basin, most obviously in regard to the occupied Palestinian territory but no less applicable to the occupied Golan Heights and the post-occupational legacy of water insecurity in southern Lebanon.

Despite several bilateral agreements featuring transboundary flows in the basin (e.g. 1994 Israel-Jordan Treaty of Peace and the 1995 Israeli-Palestinian Interim Agreement (Oslo II)), regional political conflict and Israeli occupational practices mean that there is still little prospect of a basin-wide agreement on water (ESCWA-BGR Cooperation Project 2013: 213). This is in spite of technical opportunities for positive-sum cooperation provided by the development of 'new water' (notably the substantial expansion of Israeli desalination capacity) and more efficient water management (Phillips 2012).

The chronic securitisation of water in the basin reflects of course wider territorial and ideological disputes over the region in which external powers are intimately involved. Their broader geopolitical motives and differences account for diplomatic interventions over water management preoccupied more with conflict management than conflict resolution, leaving in place sharp asymmetries in the control of water resources (Zeitoun et al. 2013). This has perpetuated underlying grievances over differential water availability in which the basin 'hegemon' (Israel) dictates the terms of engagement over future (national) water needs. There is a danger that the framing of regional water availability in terms of climate vulnerability displaces necessary political-legal analysis in favour of a technical-managerial discourse focused on adaptation within prevailing structures of water allocation and control (Messerschmid 2012; Mason 2013).

An examination of the water rights and needs of affected communities should be the baseline for donor interventions seeking to address climate and water insecurity under (post)occupation in the Jordan Basin. *International actors concerned with reducing the 'climate vulnerability' of small-scale farming communities (and other marginal groups) in the (post)occupied regions of the Jordan Basin must respect the rule of international law – international humanitarian law, international water law, and international human rights law.*

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# Forthcoming Publications

**The Uprising of the Marginalised: A Socio-Economic Perspective of the Syrian Uprising**
Dr Shamel Azmeh

More than three years into the Syrian uprising, the socio-economic roots of the protests movement, that later became one of the bloodiest conflicts in the history of the Middle East, are being observed. While it has been observed that the Syrian uprising, contrary to some 'Arab Spring' countries, has been an uprising of more marginalised social groups with a strong role of poorer segments in the society particularly rural and rural-to-urban migrants, the socio-economic explanation for this is still underdeveloped. In this paper, LSE Fellow Dr Shamel Azmeh examines the political and socio-economic compromise that underlined the rule of the Ba'ath party in Syria for four decades and unpacks how a combination of internal and external shifts that started in the 1990s and intensified in the 2000s led to the erosion of this compromise providing the background of the events that began in 2011.

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**Labour Migrants and Access to Justice in Contemporary Qatar**
Andrew Gardner et al.

Employment in the Gulf states and the remittances it produces has emerged as an important livelihood strategy for households across south Asia, southeastern Asia, Africa, and other parts of the Middle East. Although migration to the Arabian Gulf states has a history that stretches back centuries, only for the last decade have scholars, researchers, and policy-makers begun to devote substantial attention to migrants' experiences there. Despite those efforts, many gaps in our understanding of this complex migration system and labour relations in the host states persevere. This report examines migrants' access to justice in contemporary Qatar. The research is grounded in the lived experience of transnational migrants and their interactions with the state's system for adjudicating their grievances.

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