Hazards to Groundwater: Livestock

Protection of Jeita Spring

Fact Sheet

German Lebanese Technical Cooperation Project Protection of Jeita Spring

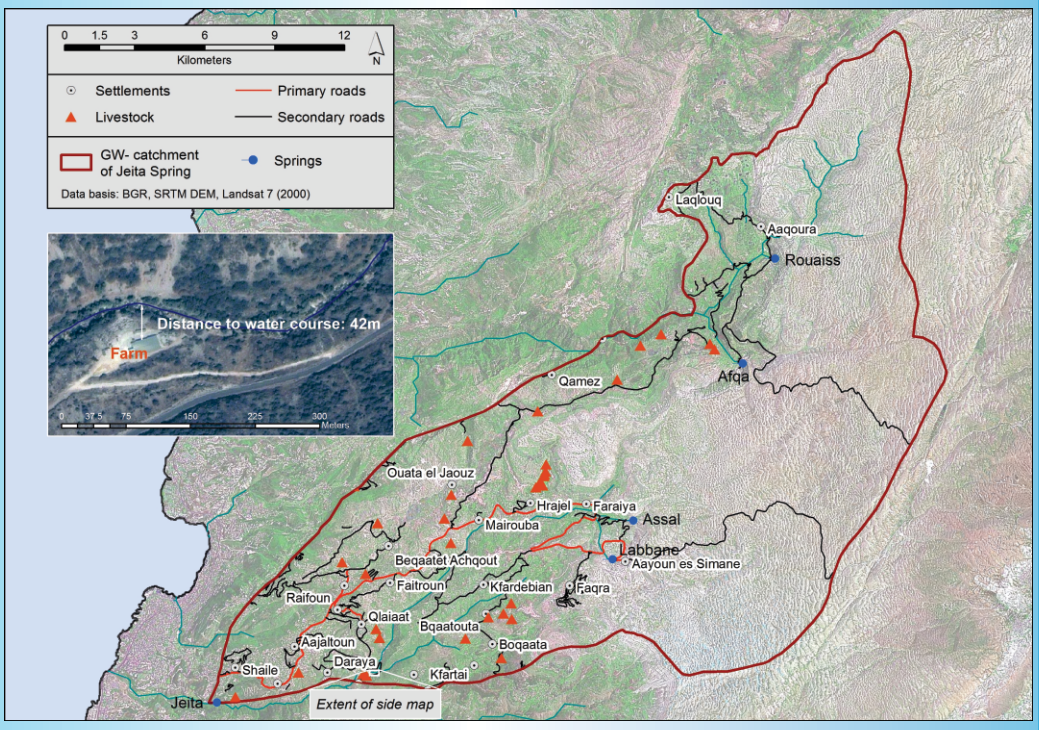
I. Introduction

- Livestock farming is practiced at small- to medium scale.
- Livestock (primarily cattle, chicken, goat, pigs and sheep) is a main threat to groundwater quality.
- Disposal of animal waste above high vulnerable GW imposes high contamination risk.
- Absence of safe and cost-efficient way of animal waste disposal.
- Two slaughterhouses are operated within the catchment.
- Governmental regulation and recycling facilities needed for improvement of waste management practices.

II. Problem Statement

- Executive purview of the livestock sector is too fragmented:
  - Ministry of Agriculture for veterinary control (animal husbandry division);
  - Ministry of Environment for environmental pollution prevention;
  - Municipality, for approval and monitoring.
- Farming conducted without relevant permits.
- Lack of environmental- and hygiene controls.
- Slaughterhouses proven to be without adequate equipment: water supply, liquid waste drainage and waste treatment.
- Illegal disposal of waste (animal wastes, etc.) and discharge of highly polluted effluent into the environment threatens surface- and groundwater
- Absence of waste collection-, treatment- and disposal systems.
- Usage of unfermented manure as fertilizer and animal carcasses imposes GW contamination risks.
- Absence of solid waste recycling.
- open air incineration enriches the soil with hazardous substances.
- Systematic negligence of landuse regulations (min. distance to roads, residential land and surface waters).
- Lack of environmental control:
  - Insufficient number of staff and funds at relevant governmental institutions;
  - Absence of environmental protection entity;
  - Absence of environmental awareness.

Livestock farming is spread all over the groundwater catchment, except on the Upper Cretaceous. Groundwater is threatened either directly via infiltration of contaminants, or indirectly via polluted "losing" streams whose discharge party infiltrates into the aquifer. Farms are often located close to streams, imposing a high risk on surface water resources.



Fresh manure, illegally disposed in bags into the environment.

Liquid waste disposal: effluent is discharged into a borehole without treatment, in absence of a proper drainage system.

Discharge of slaughterhouse's effluent into the environment - without any treatment.

Council for Development & Reconstruction (CDR)
Water Establishment Beirut & Mount Lebanon (WE-BML)
Ministry of Energy & Water (MoEW)

BGR Federal Institute for Geosciences & Natural Resources

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III. Generated Wastes & Health Risk

- Disposal of high volume of manure.
- Nitrogen in manure is converted to a soluble form (ammonium nitrate); when mixed with water, nitrate can leach into GW systems.
- Nitrate in drinking water can cause developmental deficiencies and death at babies (methemoglobinetnia, *blue-baby syndrom*).
- High rates of nitrate may cause spontaneous abortions and cancer.
- Specified risk material of cattle >30 months old:
  - Skull;
  - Brain;
  - Nerves (trigeminal ganglia and dorsal root ganglia);
  - Eyes;
  - Tonsils;
  - Spinal cord;
  - Distalileum (small intestines; for cattle of all ages);
  - Possible transmission of *Bovine Spongiform Encephalopathy.*

Accessible slaughtering in absence of minimum hygienic standards.

Liquid waste disposal at a farm.

Absence of waste collection system.

Activity	Negative environmental impact
Rearing in poultry housing	☐ Emission of ammonia, odors and dust to atmosphere and subsequent deposition on land
Cleaning hard standing around housing	☐ Contaminated runoff entering watercourses
Incineration of carcasses	☐ Stack emissions to the atmosphere (SO_2, NO_3 odors); ash build up in soil around incinerator
Litter utilization	☐ Emissions of ammonia & odors to atmosphere; surface run-off to watercourses; nutrient enrichment of soil; nitrate leaching from soil, increase in soil mineral & metal content. Aflatoxins contamination of soil and water
Storage of fuel	☐ Potential for soil & water contamination
Disposal of pharmaceutics	☐ Potential for soil & water contamination
Disposal of disinfectants	☐ Potential for soil & water contamination
Disposal of slaughtering wastes	☐ Potential for soil & water contamination

IV. Recommendations

- Apply rigid permitting process and include groundwater protection considerations.
- Update the present guidelines, according to international standards.
- Farms and slaughterhouses not operating in compliance with regulations must be closed.
- Include the requirement of properly designed drainage systems & effluent treatment facilities within the permitting system.
- Activate the role of the municipalities in stopping any hazardous dumping & restricting new permits.
- Establish facilities for collection, treatment (e.g. composting) and disposal of liquid and solid wastes from livestock farms and slaughterhouses.
- Establish law enforcement unit (environmental police).
- Pharmaceutical containers must be disposed of at designated waste disposal sites.
- Implement environmental auditing to promote environmental awareness at the public society level - but mainly at staff of farms and slaughterhouses.
- Regularly maintain and inspect the hydrocarbons storage facilities.
- Inform relevant municipality in case of detection of hazardous dumping (solid or liquid).

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