

Different tools for water quality monitoring: application for Yanta village

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Water is one of Lebanon's most precious resources, unfortunately while significant investment are made to tap water resources, very little is done to preserve it. Many Lebanese countries in the Mediterranean basin suffer from severe groundwater pollution where human activities exert strong pressure on both the quantity (water abstraction) and quality (water pollution resources).

Yanta is located at an elevation of about 1600m above sea level and extend over a surface area 100m². The village falls in the caza of Rachaiya at a distance 80km from Beirut, Mohafaza of the Bekaa. The climate is relatively cold in the region especially during winter season when invariably the village is covered by snow. Farmers invest the steep slant into a cultivating land and apply an excessive and random use of pesticides and fertilizers that may percolate with precipitation to contaminate the groundwater. Yanta rely totally on the springs as drinking water source, in which 5 springs supply the 400 families of the village, this directs doubt toward the possibility of drinking water contamination by toxic materials derived from the sprayed fertilizers and pesticides. Thus a great interest firmly demands the study of the water quality in the specified region. This study consist of installation of lysimeter at the selected spring which is a auto-sampling device for collecting water from the pore spaces of soils and for determining the soluble constituents removed in the drainage. Water samples could be successfully obtained during both the pre-monsoon and mid-rainy season periods. Concentrations of major nutrients (N, P and K) and in leached water could be monitored; elevation of these nutrients in the tested samples indicates water contamination suggesting an initial flushing of fertilizers by rains. However presence of foreign chemical molecules point out the intrusion of pesticides into the groundwater. Meanwhile, a set of intact soil columns represent the pedological nature of the area surrounding the spring of interest will be constructed, and placed in outdoor conditions to survey the fate of used pesticides through the profile of the tested soils.

In parallel, to this experimental study, a statistical and bibliographical study must be carried out attempting to establish a relation between the intrinsic characteristics of the pesticide formulation, and the texture of the soil according to the obtained results. Genuinely the aim of this research is to check the quality of drinking water, to organize the frequency of application of fertilizers taking in consideration the onset of monsoon rains and to forbid the usage of noxious chemicals in agriculture, and to recommend the usage of the most appropriate pesticides. Whenever this pilot project experience success it can be developed, eagerly supported and generalized over the nearby countries to protect the potable water resources in a global sustainable agriculture strategy. This study can be performed under the supervision and financial support of the Yantas Municipality with the technical assistance of the Ministry of Agriculture (Kfarchima Laboratory) scientific directing and result analysis.