



# **GROUNDWATER QUALITY ANALYSIS REPORT**

## ***Kampong Chnang - Kampong Leaeng - Dar (47F)***



Dar is located in the district of Kampong Leaeng. The population of this commune is approximately 5327 (2004). Groundwater sample collection occurred in June 2010 and consisted of the sampling of 15 tube wells throughout the commune. The attached figure presents the location of Dar within Kampong Chnang as well as groundwater sample locations and exceedances of health-impacting contaminants (when applicable).

### **Groundwater Quality Rating**

The groundwater quality rating for Dar is 47F. Therefore, the general safety of deep aquifer groundwater is satisfactory and the aesthetic quality of the water is very good, according to the contaminants measured and samples collected. The following two sections describe all major health and aesthetic contaminants that exceeded drinking water standards in at least one sample within the commune.

### **Contaminants of Potential Concern – Health**

**Manganese** - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese ( $>0.4$  mg/L) in tube wells is 37%, based on the observed data. Exposure to elevated concentrations of Manganese can cause neurological disorders. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

**Nitrate** - Elevated concentrations of Nitrate were observed within the commune. The estimated probability of encountering unacceptable concentrations of Nitrate ( $>50$  mg/L) in tube wells is 14%, based on the observed data. Short-term exposure to elevated concentrations can cause blue-baby syndrome in infants.

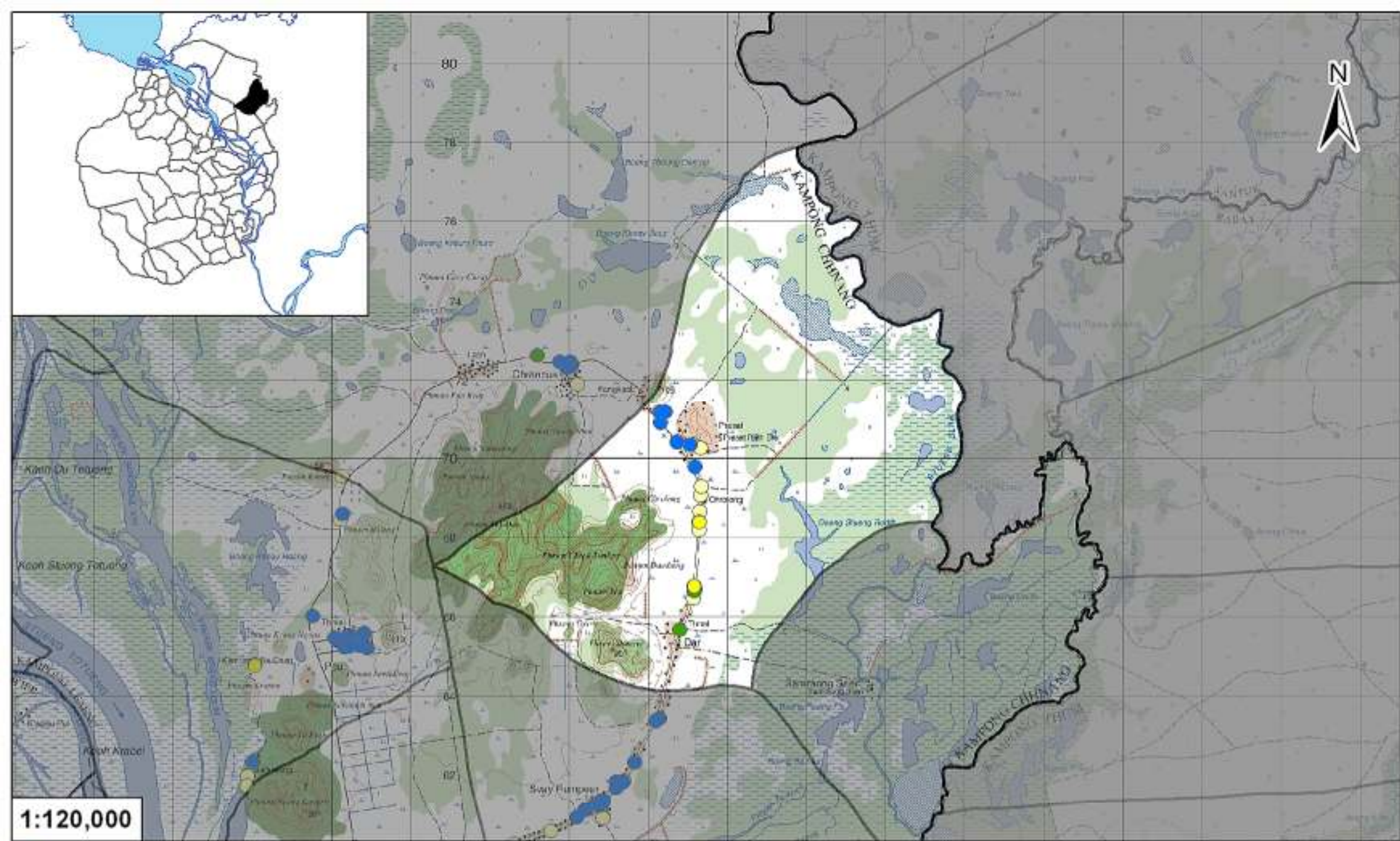
**Fluoride** - Elevated concentrations of Fluoride were observed within the commune. The estimated probability of encountering unacceptable concentrations of Fluoride ( $>1.5$  mg/L) in tube wells is 14%, based on the observed data. At concentrations greater than 1.5 mg/L, Fluoride can cause dental fluorosis and at concentrations greater than 4 mg/L, skeletal fluorosis can occur.

## **Contaminants of Potential Concern – Aesthetic**

Iron - Elevated concentrations of Iron were observed within the commune. The estimated probability of encountering potentially unacceptable concentrations of Iron (>1 mg/L) in tube wells is 27%, based on the observed data. At elevated concentrations, Iron causes water to be cloudy and unpleasant to drink. An odor may also be encountered at high concentrations. Iron can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Iron to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Iron in water but follow-up testing is recommended to ensure water quality standards are met.

Manganese - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese (>0.4 mg/L) in tube wells is approximately 37%, based on the observed data. At elevated concentrations, Manganese causes water to be cloudy and unpleasant to drink. Manganese can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

Turbidity - Elevated levels of Turbidity were observed within the commune. The estimated probability of encountering potentially unacceptable levels of Turbidity (>20 ntu) in tube wells is 12%, based on the observed data. Turbid or cloudy water appears unpleasant to the eye and is more likely have an unpleasant taste or odor. Turbidity can be reduced by filtration.



### Tube Well Sample Locations and Health-Based Exceedances

Dar - Kampong Leaeng - Kampong Chhnang - Cambodia

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- Arsenic
  - Manganese
  - Fluoride
  - Nitrate
  - No Exceedance
  - Commune Boundary
  - Provincial Boundary
- Locations exceeding the Cambodian water quality standards for major health impacting contaminants have been color-coded and arranged such that they do not overlap