Characterising and Prioritising Groundwater Pollution Threats –

DECISION-SUPPORT TOOL

Example from Narayanganj

Using Excel © Version of Decision Support System Tool

Stage 1: Assess urban activities and liquid waste disposal methods:

Activity Type	Present[1]	Urban wastewater disposal method[2]	Likelihood of troublesome contaminant concentrations reaching saturated aquifer
Recreation, commercial, municipal and other tertiary services	☑	3 -On-site disposal via soakaway or unlined collector, or by latrine/cesspit	High
Food Beverages	☑	3 -On-site disposal via soakaway or unlined collector, or by latrine/cesspit	High
Textile mills, tanning, leather processing	☑	3 -On-site disposal via soakaway or unlined collector, or by latrine/cesspit	High
Agrochemical productions/storage	☐	1 -Sewered or lined collector/drain	
Wood processing. Paper and printing products	☐	1 -Sewered or lined collector/drain	
Chemical/coal/petro/plastic products	☐	1 -Sewered or lined collector/drain	
Iron, steel, basic metal industry	☐	1 -Sewered or lined collector/drain	
Metal processing, machinery, equipment fabrication, repair workshops	☑	3 -On-site disposal via soakaway or unlined collector, or by latrine/cesspit	High
Other manufacturing industry inc. electronics	☑	2 -On-site disposal via septic tank systems, or dispersed through surface applicati	Moderate to High
Garments and semi-finished product assembly	☑	2 -On-site disposal via septic tank systems, or dispersed through surface applicati	Moderate to High
Retail, commercial, government and other tertiary services	☑	2 -On-site disposal via septic tank systems, or dispersed through surface applicati	Moderate to High
On-site sanitation from urban residential areas	☑	3 -On-site disposal via soakaway or unlined collector, or by latrine/cesspit	Moderate

[1] Check the boxes for each activity present in the city.
[2] Choose a disposal method from the drop-down list for each activity.

[3] CLICK HERE TO UPDATE THIS TABLE

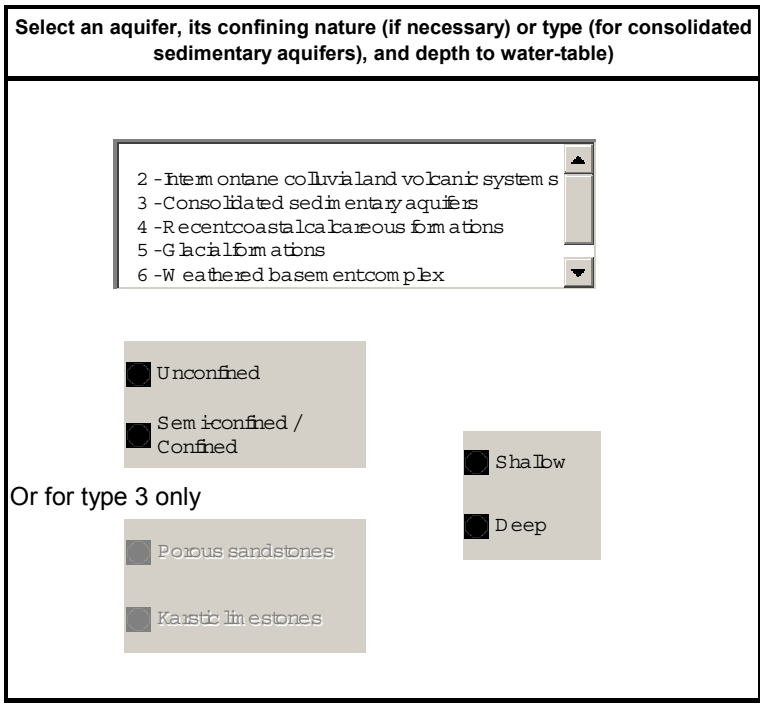
Data Entry Table 1. Urban Activities and Waste Disposal Methods

Stage 2: Assess pollution threat using simple approximations of groundwater setting

Two scenarios were assessed, because there are two hydrogeological settings with distinctly different hazard susceptibility in Narayanganj. The cover of clayey superficial deposits (soil and Recent alluvium) is variable, resulting in near-unconfined conditions in the west and south of the project area and probable semi-confined condition in central districts north of the city. Also, a number of deep brick pits are present especially on the west side of the project area. These not only remove clayey brickearth down to the shallow aquifer surface, sometimes to depth of more than 15m, but also provide large excavations up to several tens of hectares in size some of which are being used for domestic and industrial solid waste disposal. These brick pits significantly reduce the hydraulic inaccessibility of the shallow aquifer.

Scenario A assessed the less vulnerable semi-confined setting while Scenario B assessed the effect where a semi-confining layer is either thin, absent or has been removed.

Scenario A: where the shallow aquifer is semiconfined (clayey superficial deposits thick enough to form aquitard)



Data Entry Table 2. Aquifer Type and Characteristics

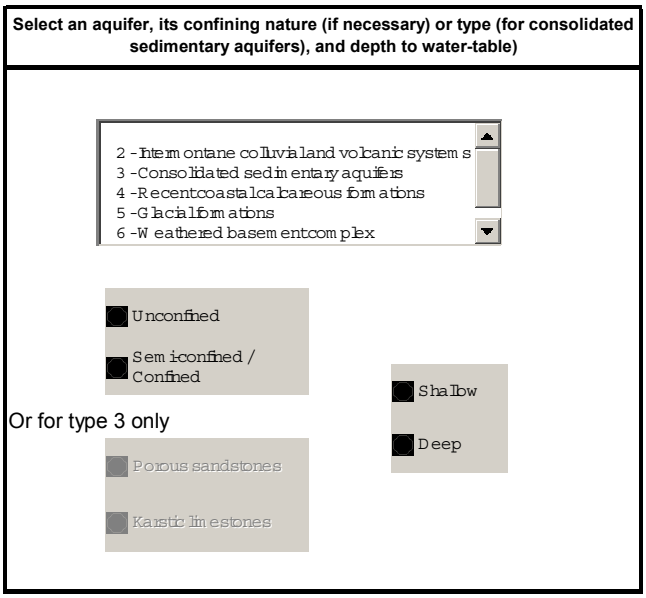
	Likelihood of contaminants being present in hazardous quantities	Likelihood of contaminants reaching saturated aquifer assuming no disposal method	Potential to cause severe and widespread contamination
Pathogens	Very likely	Unlikely	Low
Cl, N	Very likely	Very likely	Moderate
Heavy metals	Very likely	Very likely	Low
Fe, Mn	Very likely	Very likely	Low
General organic load	Very likely	Unlikely	Low
BTEX + other petroleum hydrocarbons and phenols	Very likely	Unlikely	Low
Other synthetic organics inc. biocides	Very likely	Very likely	Low
Halogenated solvents	Very likely	Very likely	Moderate

Indicative response time available before contaminants threaten use/user group	Long:- >10 years

CLICK HERE TO UPDATE TABLE

Main Results Table. Summary of Groundwater Pollution Threat

Scenario B: where the shallow aquifer is either unconfined (clayey superficial deposits thin or absent) or the clay has been removed, as in brickpits



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Fe, Mn	Very likely	Very likely	Low
General organic load	Very likely	Probably	Low
BTEX + other petroleum hydrocarbons and phenols	Very likely	Probably	Low
Other synthetic organics inc. biocides	Very likely	Very likely	Low
Halogenated solvents	Very likely	Very likely	Moderate

Indicative response time available before contaminants threaten use/user group	Long:- >10 years

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