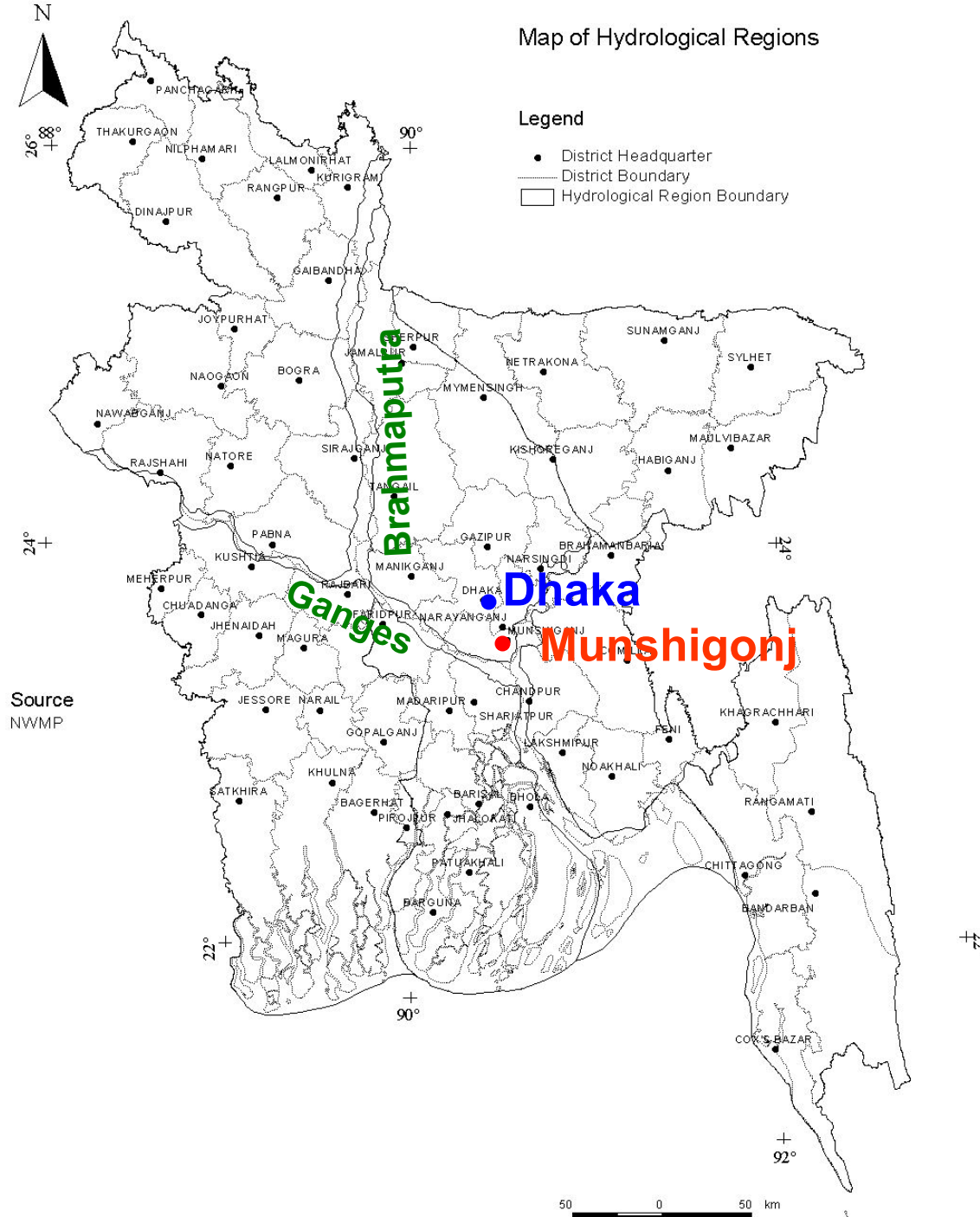


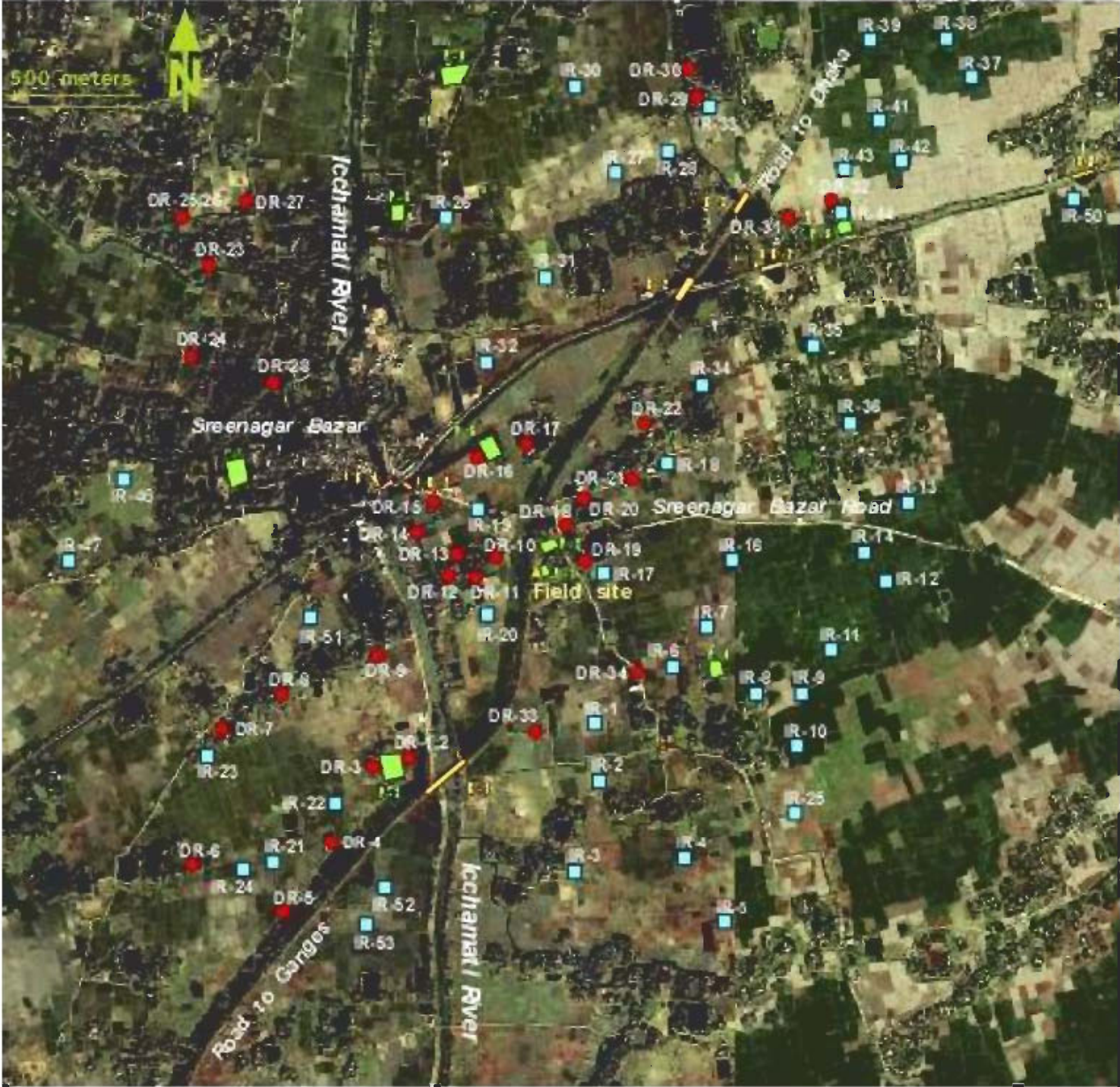
Bangladesh Case Study

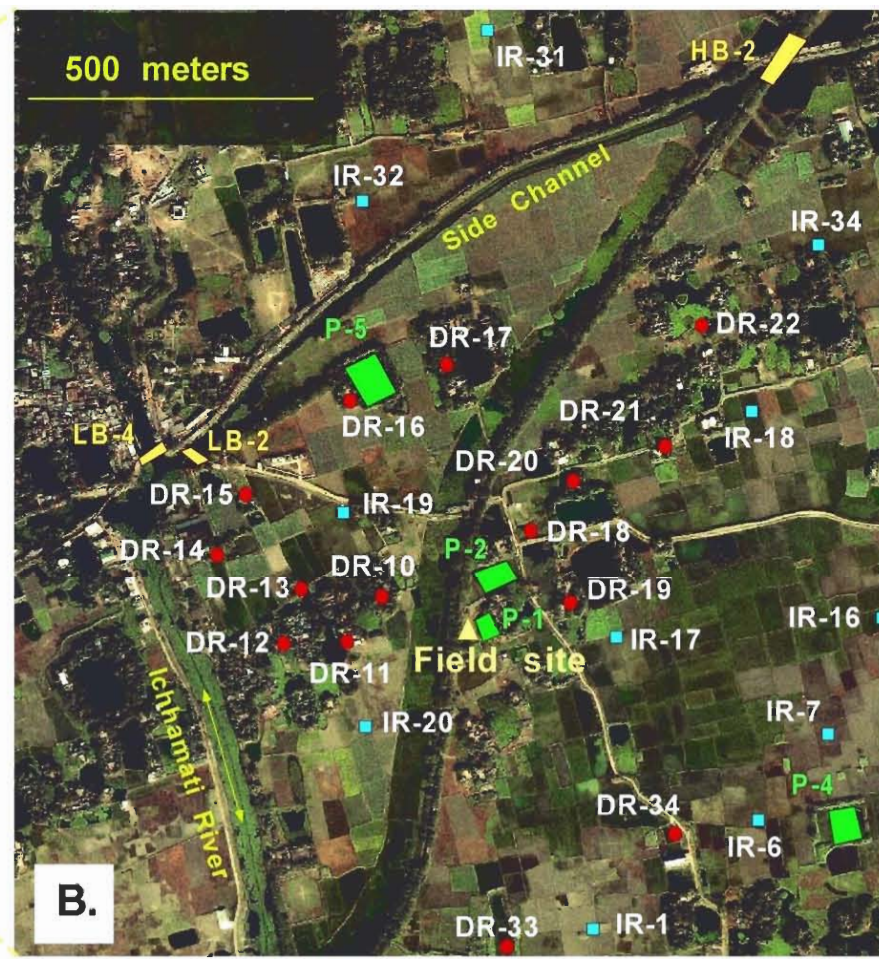
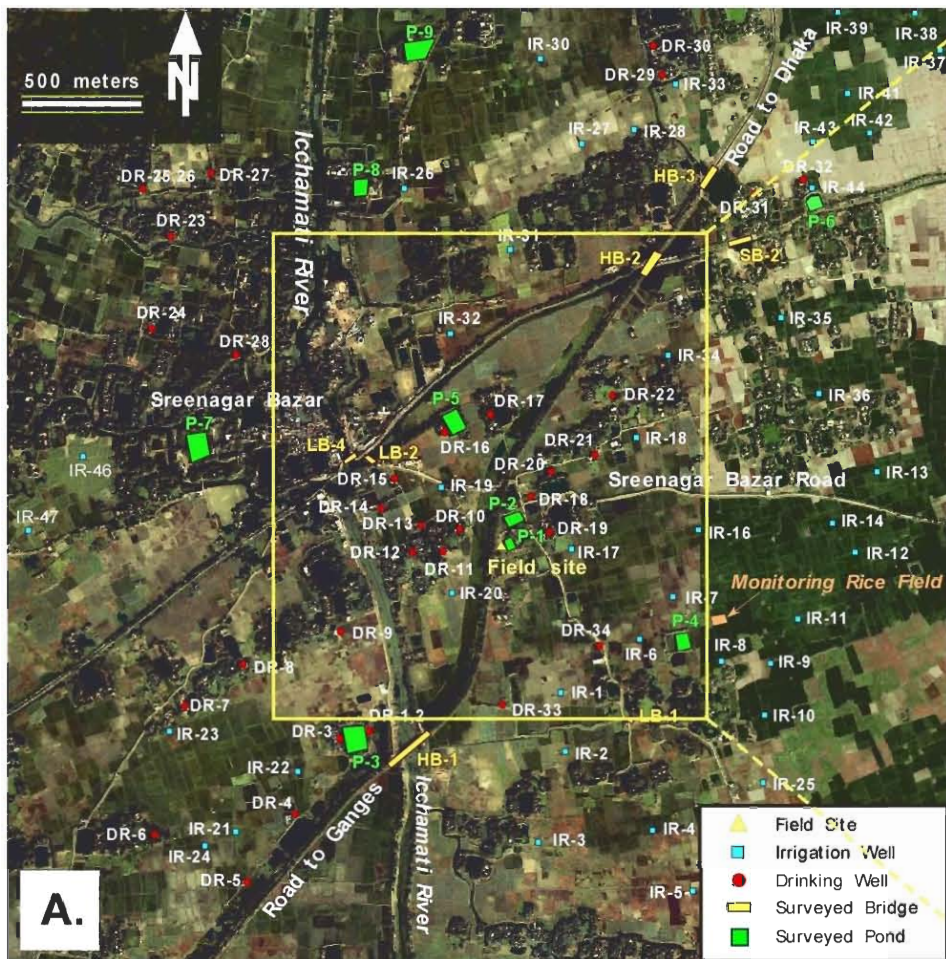
- Supplemental slides

Map of Hydrological Regions

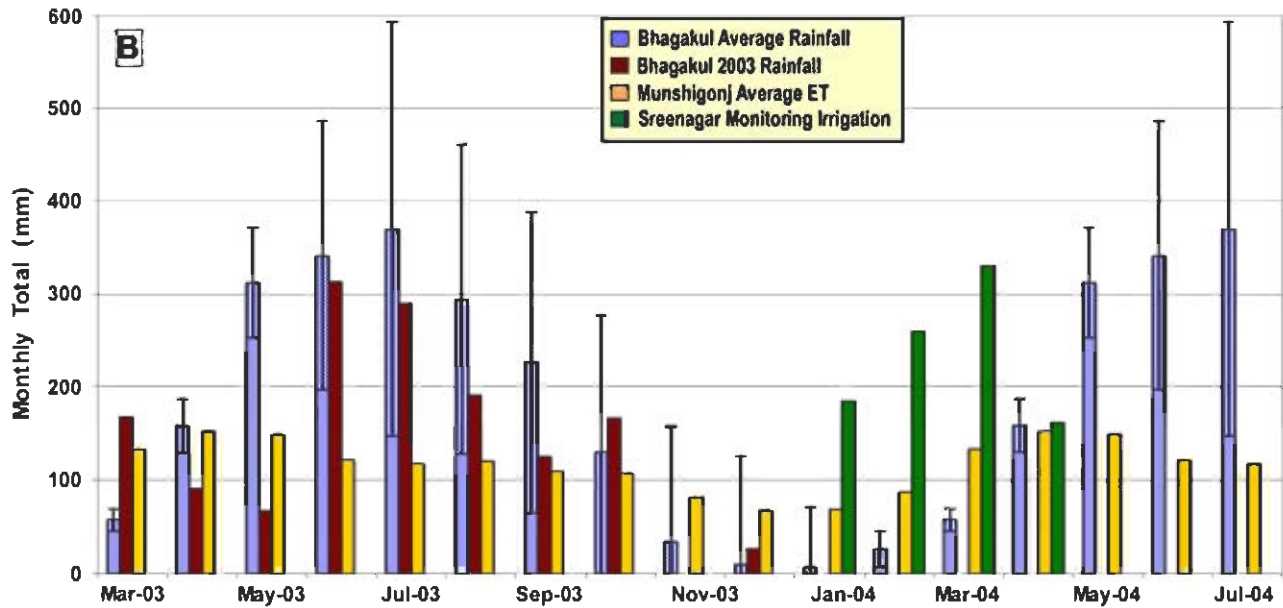
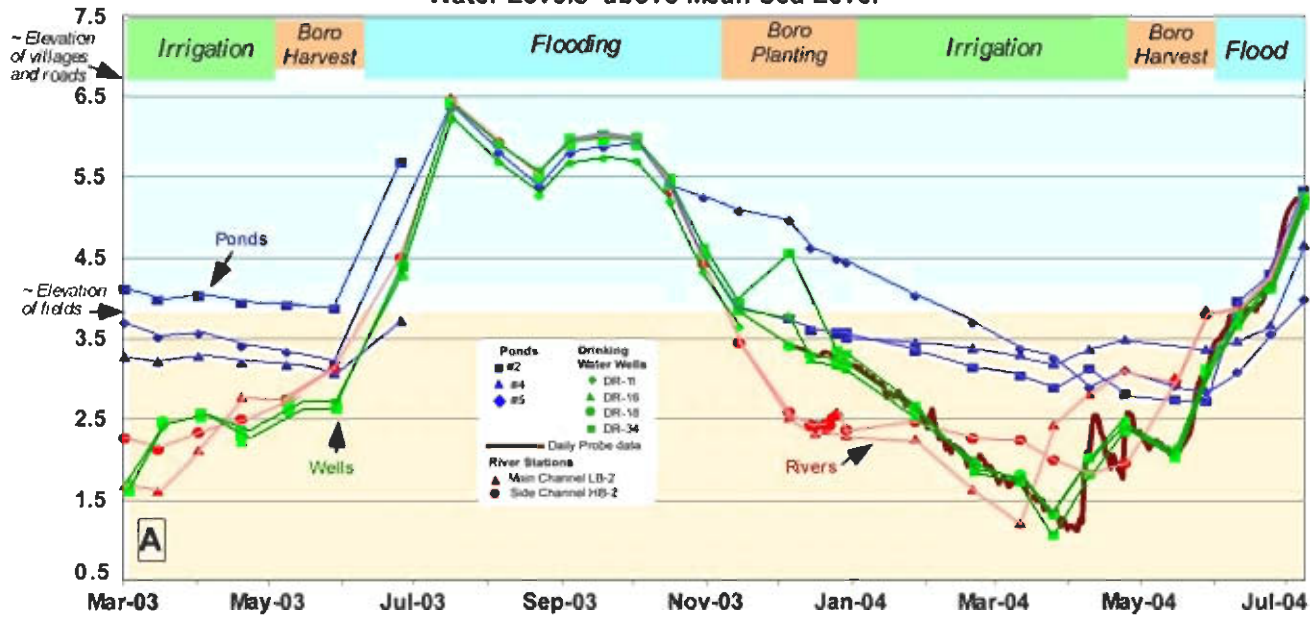


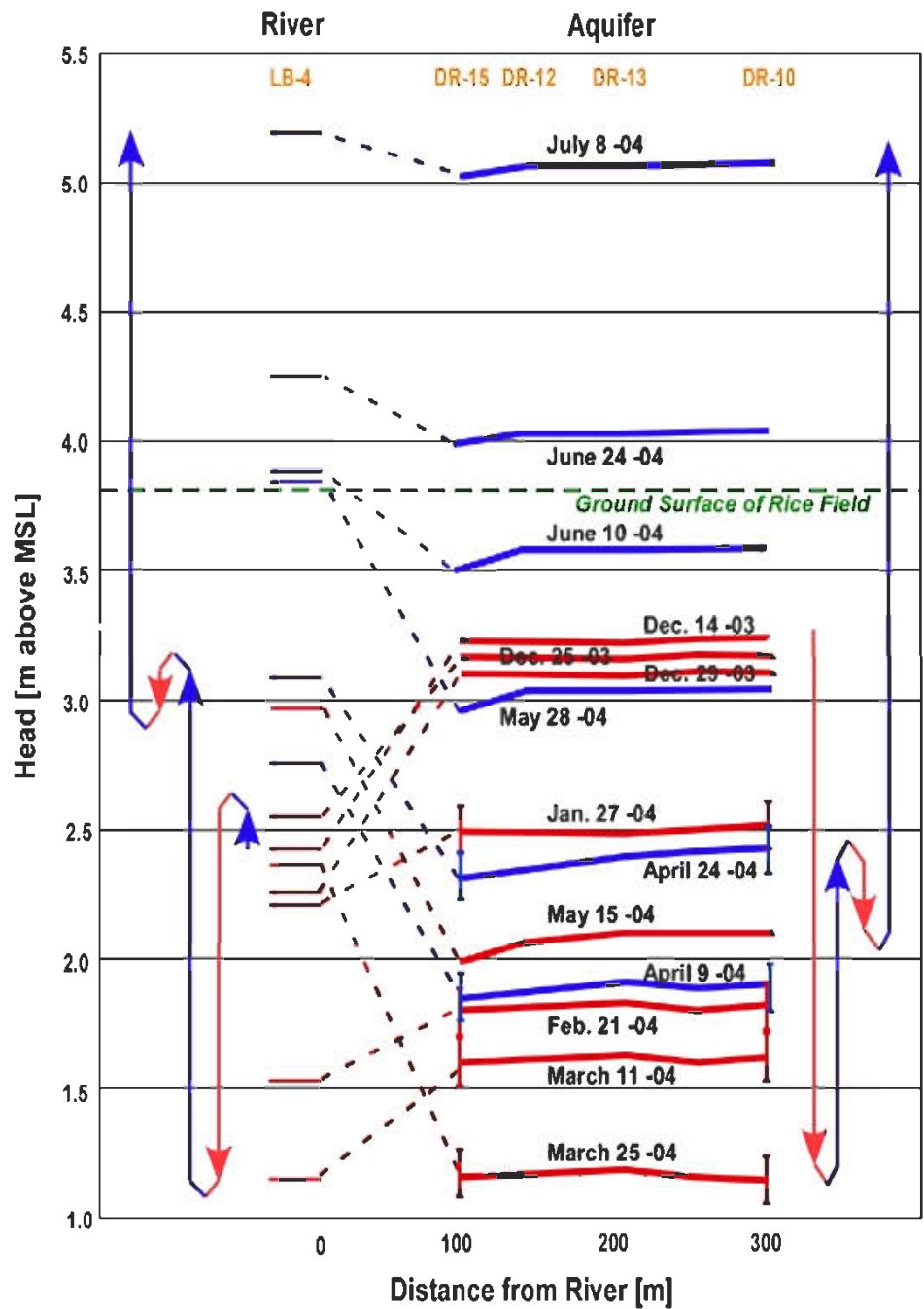
500 meters

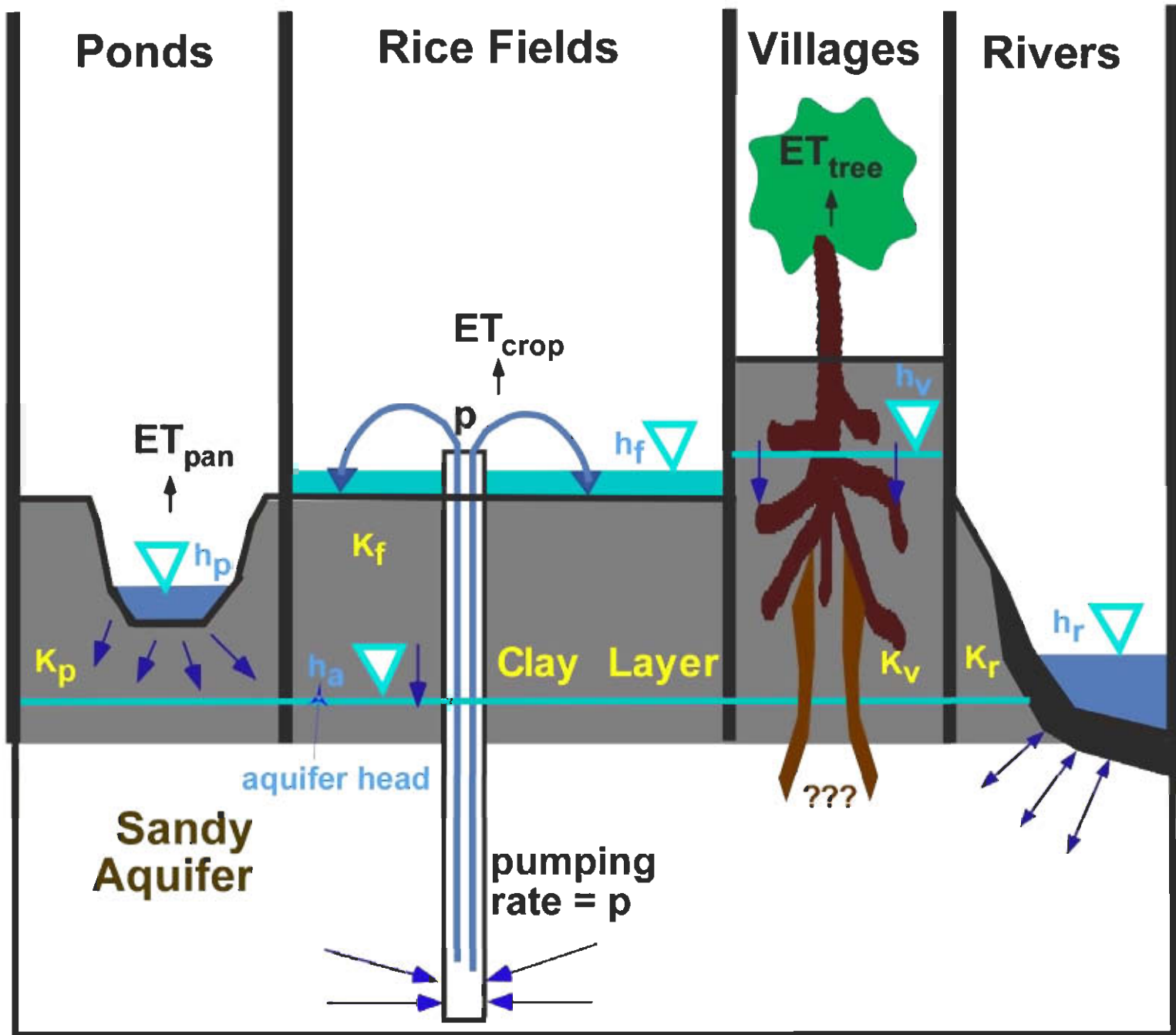




Water Levels above Mean Sea Level







The lumped-parameter model couples the mass-balance equation for the aquifer with that for irrigated fields, ponds, and non-irrigated areas

Aquifer:

$$S \frac{dh_a}{dt} = (h_f - h_a)K_f f_f + (h_p - h_a)K_p f_p + (h_r - h_a)K_r f_r + (h_v - h_a)K_v f_v - q_I - f_{av} \alpha_v ET_0$$

Village:
$$S_y \frac{dh_v}{dt} = (h_a - h_v)K_v - (1 - f_{av})\alpha_v ET_0 + R$$

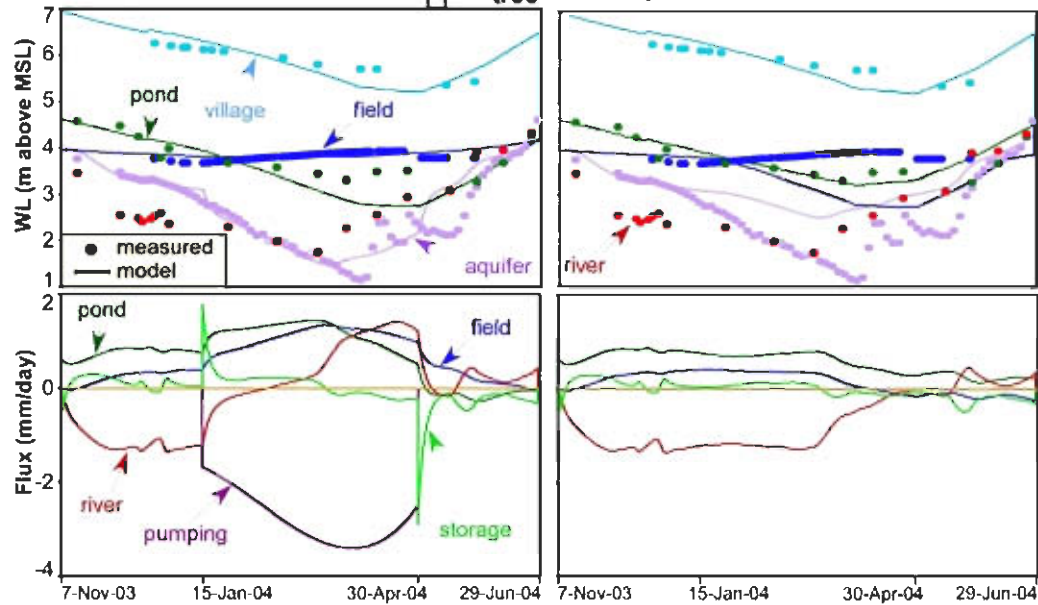
Field:
$$S_y \frac{dh_f}{dt} = (h_a - h_f)K_f - \alpha_f ET_0 + R + \frac{q_I}{f_f}$$

Pond:
$$\frac{dh_p}{dt} = (h_a - h_p)K_p - \alpha_p ET_0 + R$$

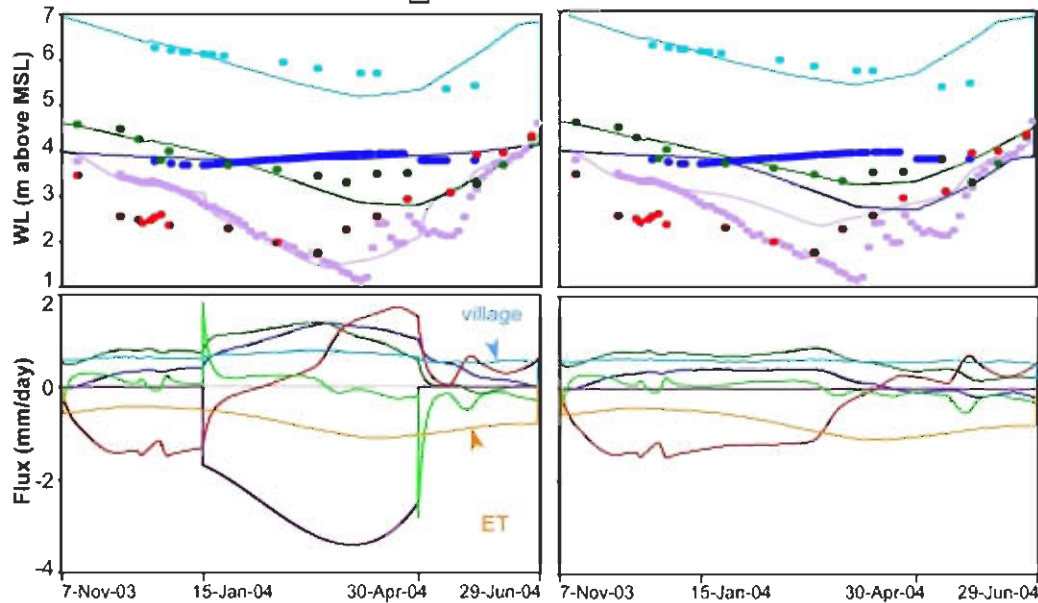
Estimated Heads and Fluxes with pumping

Predicted Heads and Fluxes without pumping

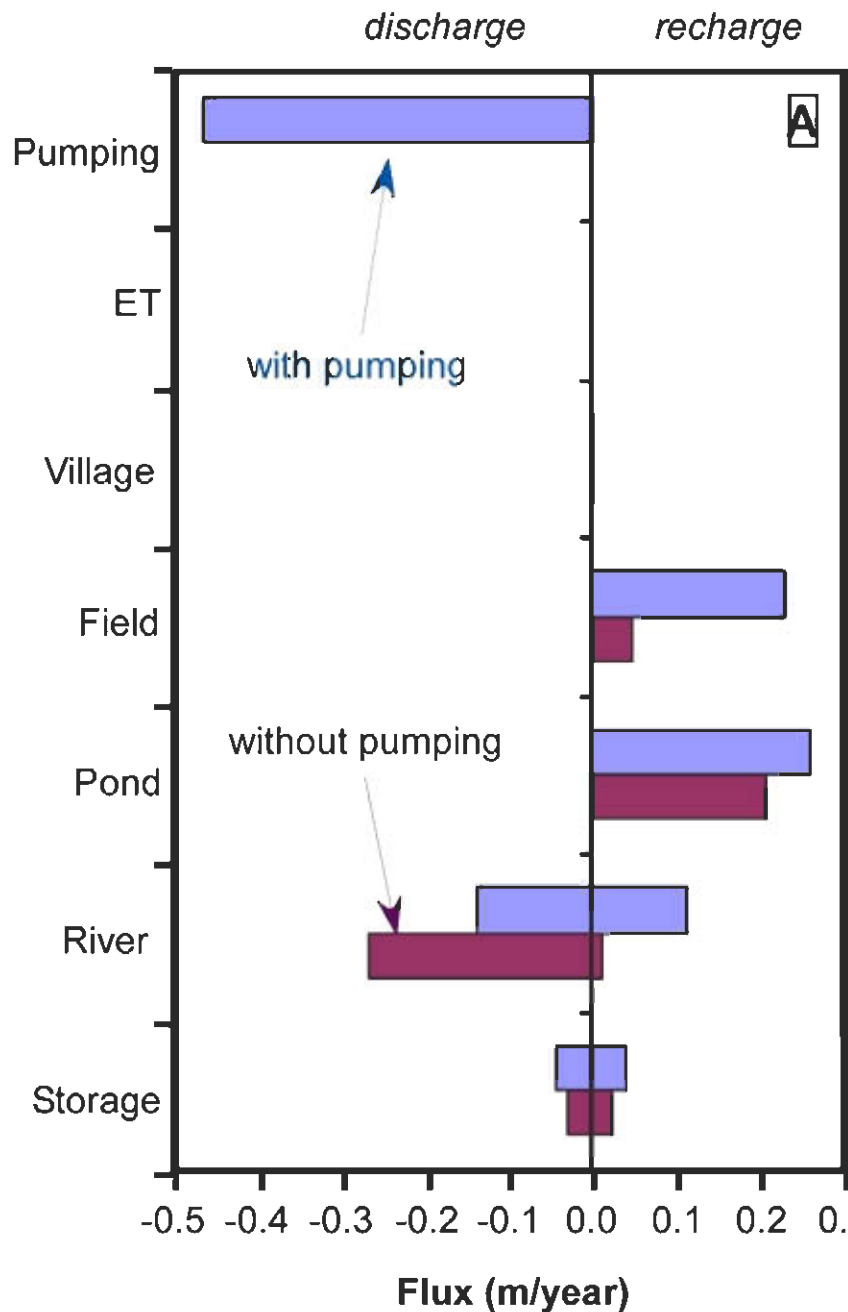
A: ET_{tree} from clay



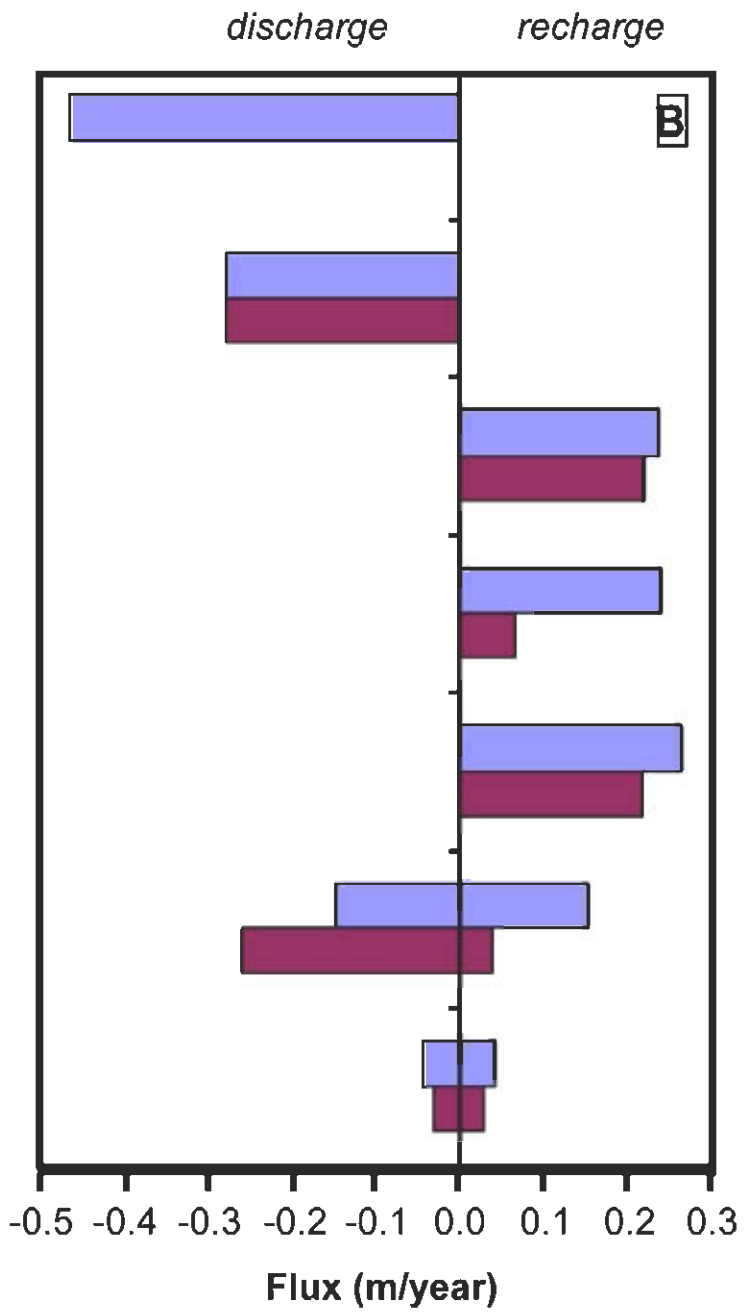
B: ET_{tree} from aquifer



Case A: tree ET from clay



Case B: tree ET from aquifer



		Case-A	Case-B
		Village ET_{tree} from clay	Village ET_{tree} from aquifer
K_f (1/d) [conductance for field]		8.9e-4	8.9e-4
K_v (1/d) [conductance for village]		6.3e-6	9.1e-4
K_p (1/d) [conductance for pond]		9.3e-3	8.3e-3
K_r (1/d) [conductance for river]		7.7e-2	8.7e-2
Objective Function <i>w/ pumping</i>		5.9e-1	5.7e-1
Residence Time (yrs)	<i>w/ pumping</i>	19	13
	<i>w/o pumping</i>	42	22