

Figure S1. Schematic of the wall BR1. Three monitoring transects were realized using 100 mm diameter PVC piezometers and installed in parallel to the maximum length of the wall to collect replicate water samples ($n = 3$) from up gradient (influent, T1), from the wall (woodchip, T2), and from down gradient (effluent, T3). Groundwater from T1 was sampled from the piezometers marked in blue, groundwater from T2 was sampled from the piezometers marked in ochre, and groundwater from T3 was sampled from the piezometers marked in green. Groundwater levels were measured in all the piezometers (P#1-P#13).

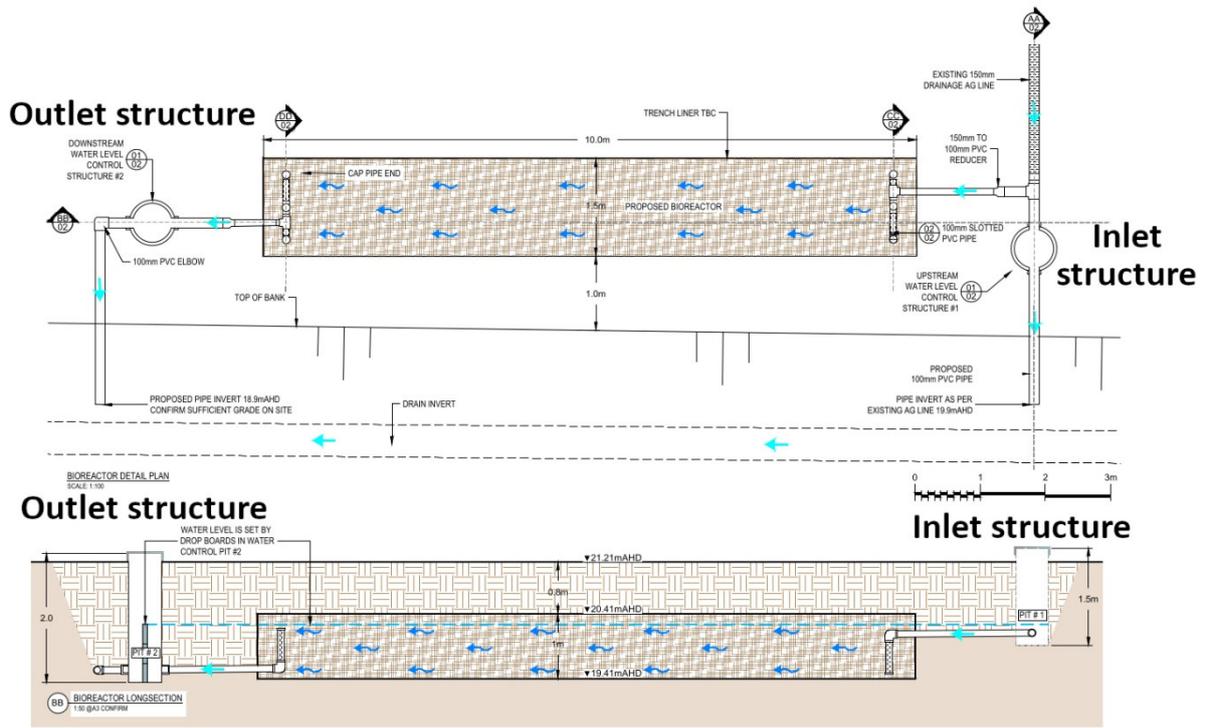


Figure S2. Schematic of the off-line bed BR2. The bed was connected to a tile-drain using a 100 mm diameter PVC pipe to divert all the subsurface water flow into the bioreactor. An inlet and an outlet control structure were installed upslope and downslope of the bed to collect influent and effluent water samples, respectively. The woodchip within the bioreactor was kept constantly saturated due to the outlet pipe installed at the top of bed. Influent water samples were collected from the inlet structure, and effluent water samples were collected from the outlet structure.

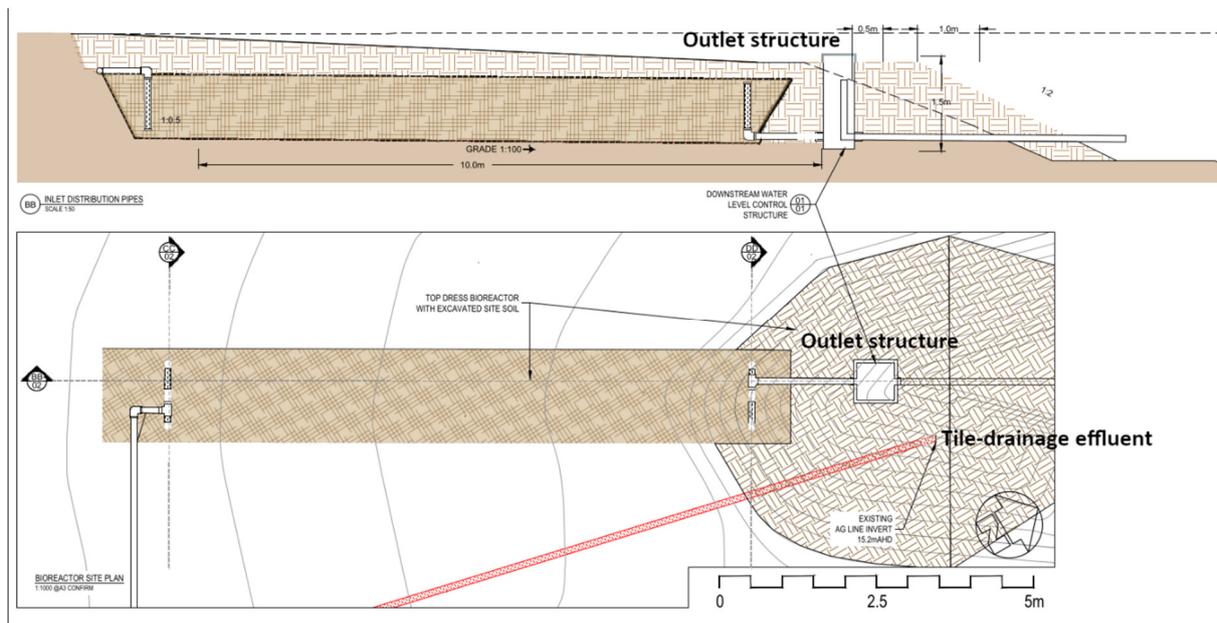


Figure S3. Schematic of the off-line bed BR3. The bed was connected to a tile-drain using a 100 mm diameter to divert all the subsurface water flow into the bioreactor. Influent samples were collected from a T-section installed at the inlet. An outlet control structure was installed downslope of the bed to collect effluent water samples. The woodchip within the bioreactor was kept constantly saturated due to the outlet pipe installed at the top of the bed.

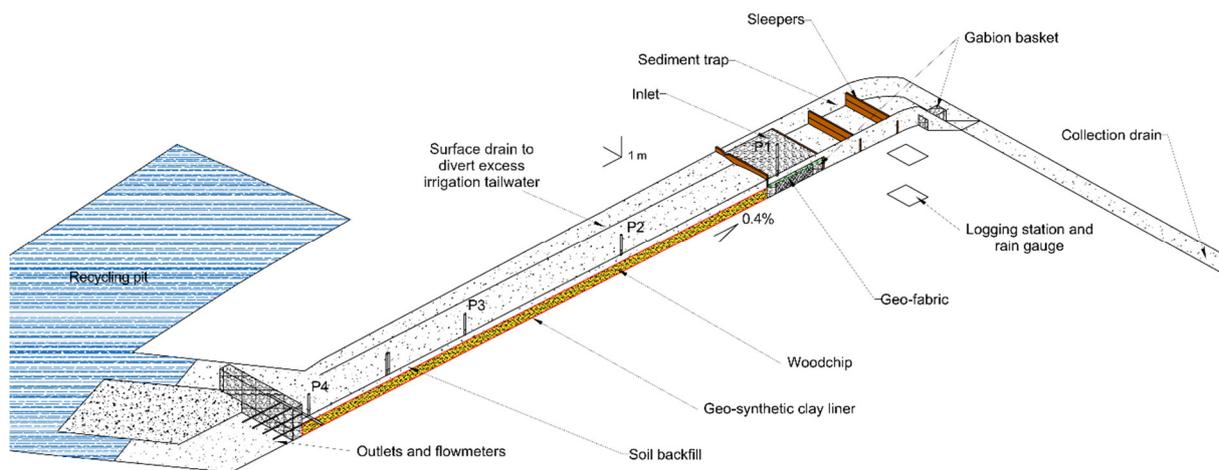


Figure S4. Schematic of the in-line bed BR4. The bed was installed in an irrigation drain to receive a proportion of the diverted irrigation tailwater. A sediment trap, comprising a series of hardwood sleeper baffles, was installed prior to the inlet structure to capture sediment and sugar cane trash transported in the irrigation tailwater. Inlet samples were collected from the inlet piezometer (P1), and effluent samples were collected from the outlet piezometer (P4).

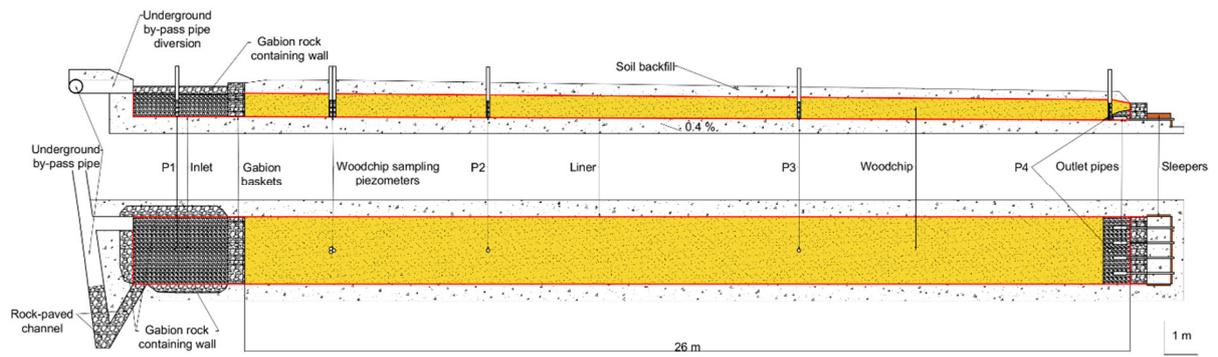


Figure S5. Schematic of the off-line bed BR5. The inlet structure received a proportion of the irrigation tailwater from an underground by-pass pipe. Inlet samples were collected from the inlet piezometer (P1), and effluent samples were collected from the outlet piezometer (P4).

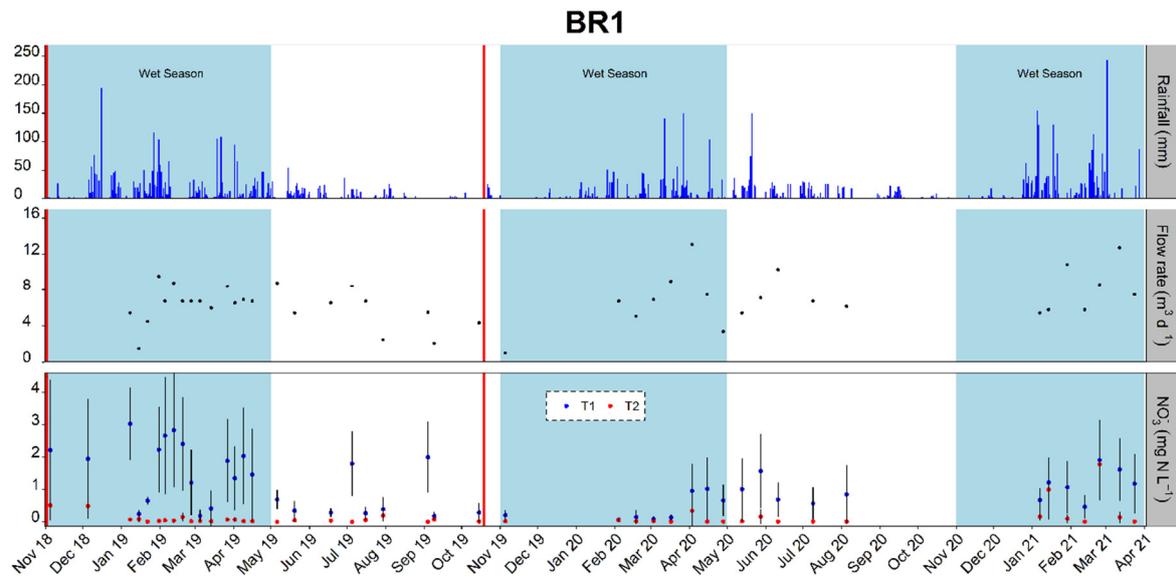


Figure S6. Rainfall, groundwater flow rate, NO₃⁻ concentrations and standard deviation of the water samples (n = 3) collected from the up gradient (T1) and wall (T2) transects of the wall BR1, installed in the wet tropics region of North Queensland, Australia. The blue background corresponds to the occurrence of the wet season, the red vertical lines show the application of the nitrogen fertilizer to the sugarcane crop upslope of the bioreactor.

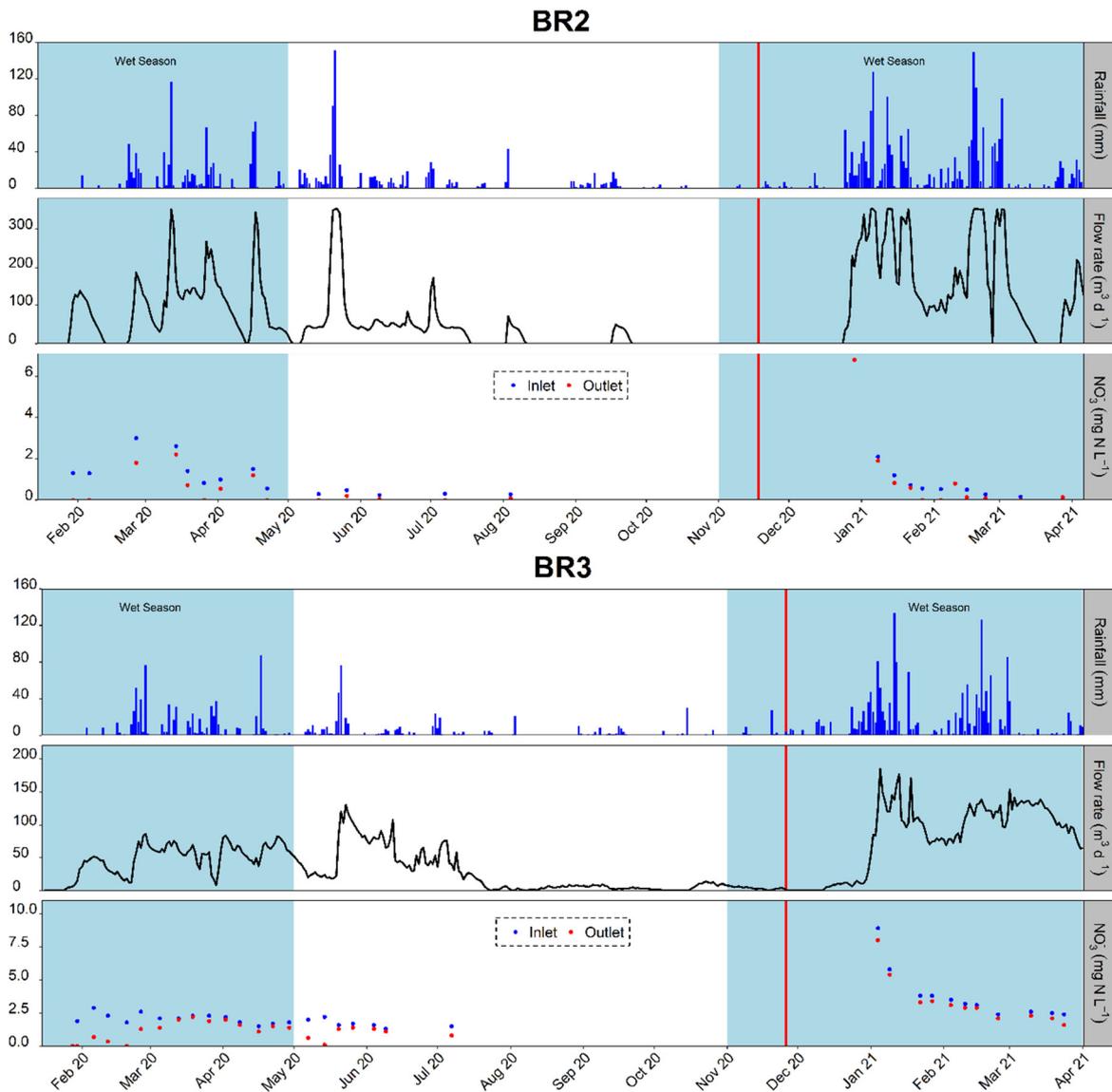


Figure S7. Rainfall, flow rate, and NO_3^- concentrations of the influent (inlet) and effluent (outlet) water samples collected from the beds BR2 and BR3, installed in the wet tropics region of North Queensland, Australia. The blue background corresponds to the occurrence of the wet season, the red vertical line shows the application of the nitrogen fertilizer to the sugarcane crop upslope of the bioreactors.

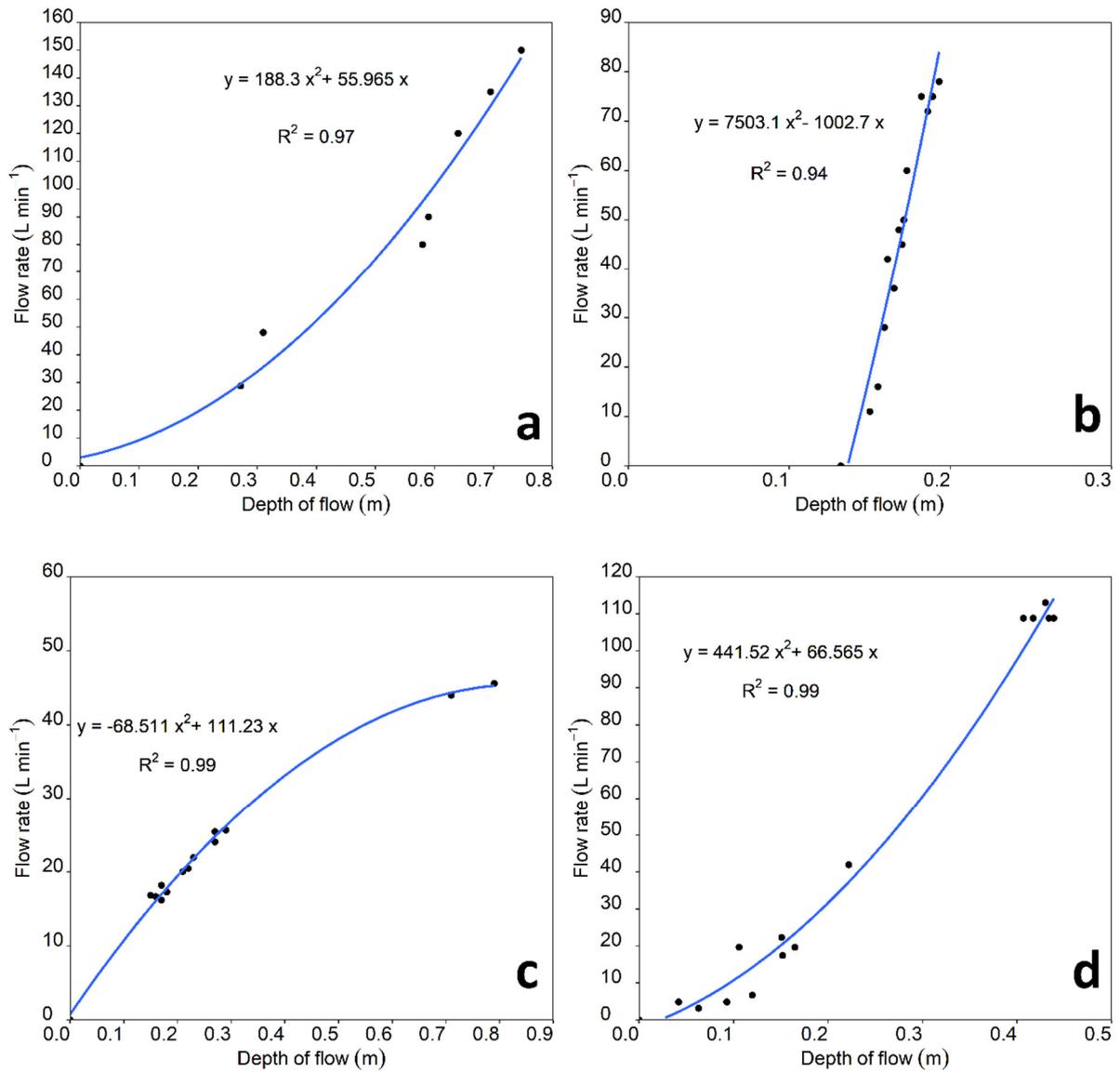


Figure S8. Discharge rating curves calculated for the beds BR2 (a), BR3 (b), BR4 (c), and BR5 (d). The discharge rating curves were developed by relating the depth of flow measured in the outlet piezometers or structures using a pressure transducer with the flow rates measured using a volumetric method at the outlet pipes under unrestricted flow, at different water flow stages.

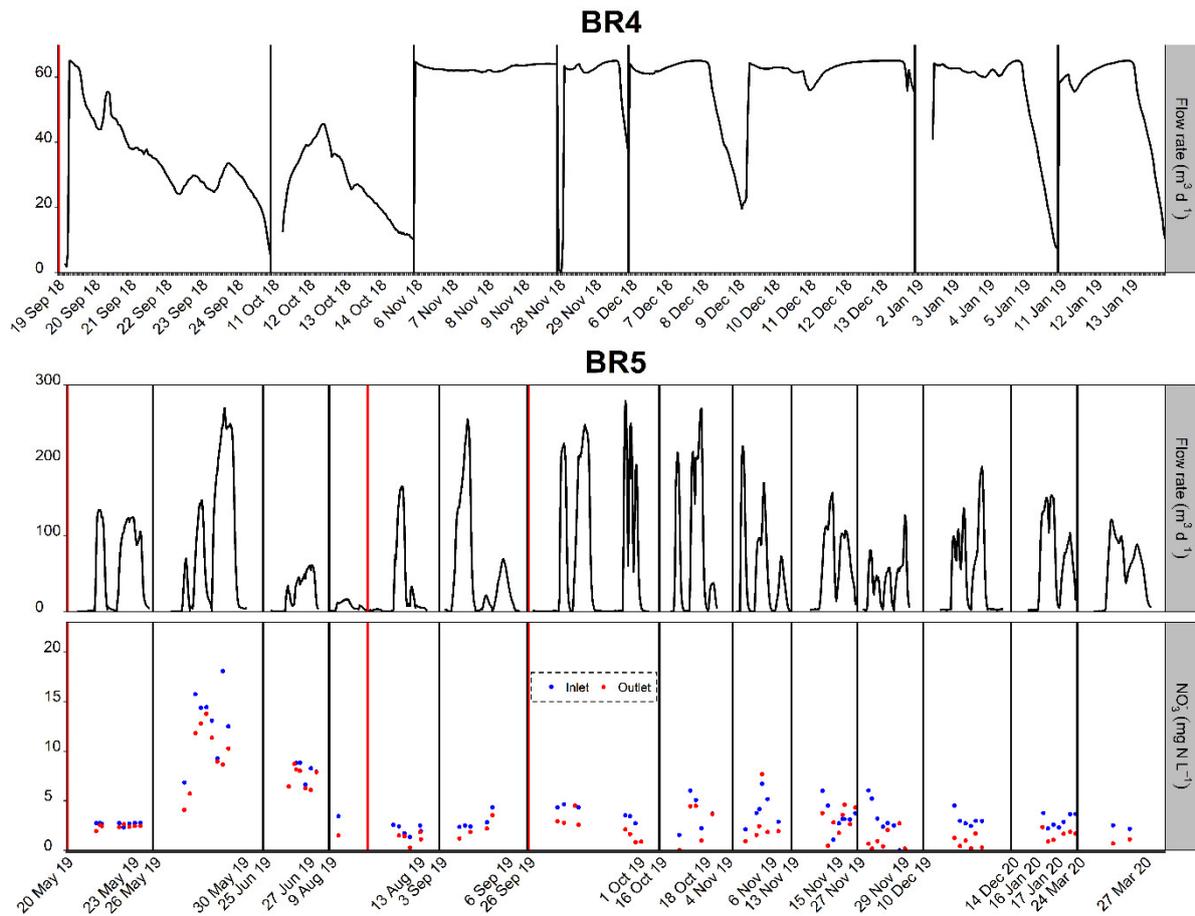


Figure S9. Flow rate of the beds BR4 and BR5, and NO_3^- concentrations of the influent (inlet) and effluent (outlet) water samples collected from the bed BR5, installed in the dry tropics region of North Queensland, Australia. The black vertical lines represent the beginning and the end of each irrigation, the red vertical lines show the application of the nitrogen fertilizer to the sugarcane crop upslope of the bioreactors. Note the three applications of nitrogen fertiliser on the sugarcane at BR5 is due to a split application of fertiliser and the catchment area having two different crop stages.