

Appendix D

List of tables

Table 2.1 Assessment questions, topics and activities.....	13
Table 3.1 Soil generic group (SGG) classes of the Gilbert catchment	40
Table 3.2 Streamflow summary metrics at gauging stations in the Gilbert catchment under Scenario A	71
Table 4.1 Categories of regional ecosystem (vegetation) communities	90
Table 4.2 Summary of Indigenous group tenure, residence, and natural resource management	101
Table 4.3 Major demographic indicators for the shires in the Gilbert catchment in 2011.....	108
Table 4.4 Overview of catchment.....	109
Table 4.5 State school enrolments by school from 2009 to 2013 (preliminary)	109
Table 4.6 Number and percentage of unoccupied dwellings and population for selected Statistical Local Areas.....	110
Table 4.7 Population triggers for community infrastructure	110
Table 4.8 Value of major economic activity in the Gilbert catchment.....	110
Table 4.9 Major agricultural activities and their annual value for the shires in the Gilbert catchment, in the 2010–11 financial year	111
Table 4.10 Cattle movements in the Flinders and Gilbert catchments, total from 2007 to 2011	111
Table 4.11 Summary of constructed dam in the Gilbert catchment. See Petheram et al. (2013) for more detail.....	115
Table 4.12 Estimated costs for road upgrades	116
Table 4.13 Road transport costs per vehicle	118
Table 4.14 Days that each major road servicing the Flinders and Gilbert catchments was closed	119
Table 4.15 Surface water entitlements and storages, ML/year.....	121
Table 4.16 Water use and entitlements in 2006	121
Table 5.1 Potential dams assessed in the Gilbert catchment	137
Table 5.2 Summary comments for potential dams in the Gilbert catchment.....	138
Table 5.3 Estimated construction cost of 3-m-high sheet piling weir.....	154
Table 5.4 Types of on-farm water storages.....	155
Table 5.5 Construction costs for a 1000-ML storage based on costs of \$4/m ³ for earthworks near Georgetown.....	161
Table 5.6 Equivalent annual cost of the construction and operation of a 1000-ML ring tank and 100 ML/day pumping infrastructure assuming a real discount rate of 7%.....	162
Table 5.7 Equivalent annual cost per ML for storages with different seepage rates near Georgetown	162
Table 5.8 Summary of conveyance and application efficiencies.....	163

Table 5.9 Water distribution and operational efficiency as nominated in water resource plans for four irrigation water supply schemes in Queensland	164
Table 5.10 Application efficiencies for surface, spray and micro irrigation systems	167
Table 5.11 Pumping costs by irrigation type	169
Table 5.12 Water quality limitations for micro irrigation systems (from Ayers and Westcott, 1985).....	170
Table 5.13 Soil water content at sowing and rainfall for the 90-day period following sowing for three sowing dates (Georgetown)	175
Table 5.14 Sowing date, crop yield, price, variable cost, gross margin and break-even crop yield for dryland crops in the Gilbert catchment	177
Table 5.15 Land use categories and crops evaluated in the Assessment	179
Table 5.16 Annual cropping calendar for potential agricultural options	180
Table 5.17 Sowing date, applied irrigation water, crop yield, irrigation type, price, variable cost, gross margin and break-even crop yield for irrigated crops in the Gilbert catchment	184
Table 5.18 Land suitability classification used in the Assessment	185
Table 5.19 Sorghum (grain) (<i>Sorghum bicolor</i>)	189
Table 5.20 Mungbean (<i>Vigna radiata</i>)	192
Table 5.21 Bambatsi (<i>Panicum coloratum</i> var. <i>makarikariense</i>).....	196
Table 5.22 Lablab (<i>Lablab purpureus</i>)	199
Table 5.23 Cotton (<i>Gossypium spp.</i>).....	203
Table 5.24 Sugarcane (<i>Saccharum</i>)	206
Table 5.25 Sweet corn (<i>Zea mays</i> var. <i>saccharata</i>).....	209
Table 5.26 Peanuts	212
Table 5.27 Indian sandalwood (<i>Santalum album</i>).....	215
Table 5.28 Mango (<i>Mangifera indica</i>)	219
Table 5.29 Scheme-scale capital and operating costs for a 10,000-ha potential irrigation development and Green Hills dam	220
Table 5.30 Summary statistics for a 10,000-ha potential irrigation development and Green Hills dam.....	221
Table 6.1 Key features of the five scenarios used in the analysis with the North Australia Beef Systems Analysis tool for Georgetown	231
Table 6.2 Modelled results from the analysis using the North Australia Beef Systems Analysis tool, under scenarios 1 to 5 for Georgetown from 1996 to 2010.....	233
Table 6.3 Assumptions for analysis of irrigation investment	235
Table 6.4 Financial performance indicators for selected irrigation investment scenarios	236
Table 6.5 Net present values under selected irrigation investment scenarios	237
Table 6.6 Net present value and internal rate of return	238
Table 6.7 Assumptions for capital and operating costs for irrigation developments	240
Table 6.8 Scheme-scale capital and operating costs	241
Table 6.9 Break-even annual gross margins required under different combinations of scheme-sale capital cost and irrigated area.....	242

Table 6.10 Scaling factors for gross margins accounting for changed reliability (60 to 90%) and timing of failed years (early and late in the cash flow).....	242
Table 6.11 Minimum water price charged by supplier to cover capital and operating costs under different combinations of scheme-sale capital cost and irrigated area.....	243
Table 6.12 Minimum water price charged by supplier to cover operating costs under different combinations of scheme-sale capital cost and irrigated area.....	243
Table 6.13 Capacity of irrigators to pay for water (break-even water price) under different combinations of gross margin and irrigation use.....	244
Table 6.14 Summary of labour requirements	246
Table 6.15 Population for selected statistical local areas	246
Table 7.1 Typical values of specific yield and saturated hydraulic conductivity	256
Table 7.2 Likely range of values for parameters in the Gilbert catchment	257
Table 8.1 Streamflow on the Gilbert River at the Green Hills dam site under Scenario A.....	281
Table 8.2 Parameters for Green Hills dam	281
Table 8.3 Assumed conveyance efficiencies for the irrigation development associated with the Green Hills dam	282
Table 8.4 Scheme-scale and farm-scale costs for the irrigation development associated with the Green Hills dam	283
Table 8.5 Critical infrastructure in the Green Hills area.....	284
Table 8.6 Key assumptions in the gross margin calculations for cotton under spray irrigation for the irrigation development associated with the Green Hills dam.....	294
Table 8.7 Key assumptions in the gross margin calculations for peanuts under spray irrigation for the irrigation development associated with the Green Hills dam.....	294
Table 8.8 Key assumptions in the gross margin calculations for sorghum (forage) under spray irrigation for the irrigation development associated with the Green Hills dam.....	295
Table 8.9 Staging of construction, farm development and crop production	297
Table 8.10 The impact of transporting unprocessed cotton to three alternative locations from the Green Hills dam irrigation development.....	302
Table 8.11 Range of parameter values used in analytical groundwater model at Green Hills dam irrigation development.....	303
Table 8.12 Summary of potential ecological, social and cultural considerations with respect to the 12,000-ha Green Hills dam irrigation development.....	305
Table 9.1 Streamflow on the Gilbert and Einasleigh rivers at the potential Green Hills and Dagworth dam sites under Scenario A	320
Table 9.2 Green Hills and Dagworth dam parameters	321
Table 9.3 Conveyance efficiency assumptions for the irrigation development associated with the Green Hills dam	322
Table 9.4 Assumed conveyance efficiency assumptions for the irrigation development associated with the Dagworth dam.....	323
Table 9.5 Scheme- and farm-scale costs for the irrigation development associated with Green Hills dam..	324
Table 9.6 Indicative irrigation development, scheme-scale and farm-scale costs associated with the Dagworth dam irrigation development.....	325

Table 9.7 Critical infrastructure requirements in the Georgetown area	326
Table 9.8 Key assumptions in the gross margin calculations for sugarcane	333
Table 9.9 Staging of construction, farm development and crop production	336
Table 9.10 The impact of transporting sugarcane from the irrigation development associated with Green Hills dam to Georgetown and Mareeba	341
Table 9.11 The impact of transporting sugarcane from the irrigation development associated with Dagworth dam to Georgetown and Mareeba.....	341
Table 9.12 Range of parameter values used in analytical groundwater model at Dagworth dam and Green Hills dam irrigation developments	342
Table 9.13 Summary of likely ecological changes as a result of the Dagworth dam and Green Hills dam irrigation developments. This involved analysis of 16,000 ha of sugarcane under spray irrigation at both locations	343
Table 10.1 Streamflow on the Copperfield River at the Kidston Dam under Scenario A.....	358
Table 10.2 Parameters for Kidston Dam	359
Table 10.3 Assumed conveyance efficiencies for the irrigation development associated with the Kidston Dam	360
Table 10.4 Scheme-scale and farm-scale costs for the irrigation development associated with the Kidston Dam	361
Table 10.5 Critical infrastructure in the Einasleigh and Georgetown area	362
Table 10.6 Key assumptions in the gross margin calculations for Rhodes grass for irrigation development associated with the Kidston Dam.....	368
Table 10.7 Staging of construction, farm development and crop production.....	370
Table 10.8 Range of parameter values used in analytical groundwater model for the irrigation development associated with the Kidston Dam.....	374
Table 10.9 Summary of potential ecological, social and cultural considerations with respect to the 1000-ha irrigation development associated with Kidston Dam	375