13 Marlborough's Ecological Footprint

13.1 Profile of the region

The Marlborough region covers an area of 1,248,400 ha, making it the ninth largest region in New Zealand. It covers the top north-eastern corner of the South Island and consists of three distinct areas – the Marlborough Sounds, the fertile Wairau Plains and the extensive tussock covered back country. Most (68 percent) of the population live in the Blenheim urban area.

Marlborough population is only 39,699, making it the third to smallest region in New Zealand ahead of the West Coast and Tasman. The population is not only relatively small, but widely dispersed with Marlborough having a population density of 3.18 people/km^2 which is the third-lowest of any region in New Zealand. Over the entire region, population growth has mainly been confined to the area surrounding the Marlborough Sounds.

The Marlborough economy is based on a buoyant primary sector. The location quotients for various primary sector industries indicate a real strength in these areas: horticulture (3.85), fishing and aquaculture (9.60) and forestry and logging (2.06). The region is currently the largest and fastest growing grape producing area in the country. The aquaculture industries are also important with farms specialising in production of mussels, oysters, salmon and scallops. Forestry is also a rapidly expanding industry, a reflection of the area's good climate and growing conditions.

The downstream processing of primary products is also important with the manufacturing of food (LQ 3.66) and beverages – mainly wine (LQ 6.04) having high location quotients for the region. The multiplier effects of primary production and processing also extends to the rest of the regional economy, indirectly generating jobs in the service sector.

Tourism is also an important industry for Marlborough not only because of its proximity to inter-island tourist traffic but also because of the attractions of the Marlborough Sounds, it's sunny and mild climate and tourism activities associated with primary production such as vineyards. The location quotient for the accommodation, restaurant and café sector (1.22) accordingly is above the national average.

The presence of the Woodburne Air Force Base also has an influence on the economy, making the central government sector the second highest employer next to horticulture, of any sector in Marlborough. The location quotient for central government is high at 2.92, which is actually the highest in country even exceeding Wellington's.

13.2 Overall ecological footprint and comparison with other regions

Marlborough has an ecological footprint of 163,810 ha. This represents only 1.52 percent of New Zealand's ecological footprint and ranks it 12th of 16 regions in New Zealand. Only Gisborne, West Coast, Tasman and Nelson have lower ecological footprints. The smallness of the ecological footprint of all of these regions including Marlborough is due to their low population base.

Notably, on a per capita basis, Marlborough has the second to highest ecological footprint of any region at 4.13 ha per person. The main reason for this high per capita footprint is the very

low productivity and stocking rates of Marlborough land. In comparative terms Marlborough land is of low productivity when it comes to pastoralism which is the main land use, although there may be pockets of relatively productive land used for horticultural uses. This means more land is required to produce the same amount of product. Analysis of agricultural data from Statistics New Zealand (1998c) indicates, for example, that the stocking rate for Marlborough land is 2.79 stock units per hectare compared with a national average of 7.52 stock units per hectare. This means that the per capita use of agricultural land in Marlborough is high with the per capita use of forest, degraded and energy land being around the national average.

The useful land area of Marlborough is 606,090 ha, far exceeding the ecological footprint of Marlborough's consumption at 163,810 ha. In fact, the level of Marlborough consumption would need to increase 3.70 times before there was an overshoot of useful land area. Overall, in net terms, this means that the Marlborough region is ecologically self-sufficient and has an ecological surplus of 442,280 ha. So even though Marlborough may not be an efficient user of land as indicated by the per capita footprint, it falls a long way short of reaching overshoot due to the abundance of land in Marlborough relative to its population base.

13.3 Ecological footprint disaggregated by land type

The agricultural land component of the ecological footprint consists of 121,460 ha (refer to Table 13.1). This represents 74.2 percent of Marlborough's ecological footprint. Most of the land is agricultural land sourced from within the region (102,910 ha) with only small amounts of agricultural land drawn from other regions (2270 ha) or other nations (15,780 ha). The high proportion of agricultural land sourced from within the region is not surprising given the abundance of agricultural land in Marlborough. Most of the agricultural land drawn from other regions is embodied in dairy products imported from the Waikato and Southland, although these are relatively very small amounts compared with agricultural land obtained within the region.

Table 13.1 Marlborough's ecological footprint by land type, 1997–98

Land type	Within region land (ha)	Land from other New Zealand regions (ha)	Land from other nations (ha)	Total land (ha)	Total land (ha per capita)	Total land (% of total)
Agricultural land	102,910	2,770	15,780	121,460	3.06	74.2
Forest land	8,650	180	1,320	10,150	0.26	6.2
Degraded land	12,070	210	850	13,130	0.33	8.0
Energy land	13,830	570	4,650	19,050	0.48	11.6
Total	137,460	3,730	22,600	163,790	4.13	100.0

The forest land component of the ecological footprint consists of 10,150 ha. This represents 6.2 percent of the Marlborough ecological footprint, slightly below the New Zealand average. Most (8650 ha) of the forest land is drawn from within the Marlborough region with very little (180 ha) being obtained from other regions in New Zealand. A significant amount (1320 ha) of the forest land is however appropriated from other nations.

The degraded land component of the ecological footprint consists of 13,130 ha. This represents 8.0 percent of the Marlborough footprint. Almost all this degraded land is derived from within the Marlborough region (12,070 ha). Surprisingly, only a small amount of degraded land is imported from other regions (570 ha) and other nations (850 ha).

The energy land component of the Marlborough ecological footprint is 19,050 ha. This is only 11.6 percent of Marlborough's footprint, which is low compared with the national percentage of 16.6 percent. However, on a capita basis the energy land component for Marlborough (0.48 ha/person) is close to the New Zealand average figure (0.51 ha/person). This latter figure suggests that the level of energy efficiency in Marlborough may be slightly better than the national average.

13.4 Ecological footprint disaggregated by goods and services purchased

13.4.1 Purchase of Marlborough produced goods and services (P_1+P_2 ... P_n)

The purchase of manufacturing sector products accounted for 65,810 ha of embodied land (refer to Table 13.2). This amounts to 40.2 percent of the entire ecological footprint of the Marlborough region, significantly below the national average of 44.5 percent. Almost all of land embodied in these manufacturing products is sourced within the region (60,120 ha).

Table 13.2 Marlborough's ecological footprint by economic products, 1997–98

Economic products consumed	Within region land (ha)	Land from other New Zealand regions (ha)	Land from other nations (ha)	Total land (ha)	Total land (ha per capita)	Total land (% of total)
Agriculture	20,010	10	260	20,270	0.51	12.4
Forestry	460	0	0	470	0.01	0.3
Fishing and hunting	10	0	0	10	0.00	0.0
Mining and quarrying	10	0	10	20	0.00	0.0
Manufacturing	60,120	2,680	3,000	65,810	1.66	40.2
Utilities and construction	9,640	100	1,110	10,840	0.27	6.6
Services	39,430	220	5,250	44,900	1.13	27.4
Domestic final demand	7,780	740	12,960	21,480	0.54	13.1
Total	137,460	3,760	22,590	163,810	4.13	100.0

The purchase of agricultural sector products accounts for 20,270 ha, 12.4 percent of the ecological footprint of the Marlborough region. This figure for land embodied in agricultural products is considerably higher than the national average of 7.8 percent. Also, on a per capita basis, the land embodied in agricultural products consumption in Marlborough at 0.51 ha/capita is more than double the national figure of 0.24 ha/capita.

It therefore appears that Marlborough residents are purchasing more agricultural products (fresh fruit and vegetables, vineyard products) directly from the agricultural sector, and these are substituting for goods usually bought as purchases from the manufacturing sector. This explains both the comparatively low embodied land in manufacturing products and high embodied land in agricultural products.

The purchase of service sector products accounted for 44,900 ha of the embodied land in the Marlborough ecological footprint. This amounts to 27.4 percent of the entire ecological footprint of the Marlborough region. Most of these service sector products (insurance, finance, retail margin) directly and indirectly draw on land from within the Marlborough region (39,430 ha). Only a very insignificant amount of land (220 ha) is embodied in service sector products appropriated from other regions. On the other hand, the amount of overseas land embodied in purchases by the service sector is relatively high at 5250 ha.

The land embodied in other products used by Marlborough consumers is much smaller for the other sectors: forestry (470 ha), fishing and hunting (10 ha), mining and quarrying (20 ha), and utilities and construction (10,840 ha).

13.4.2 Purchase of goods and services produced outside Marlborough (D_1+D_4)

Marlborough residents purchased products imported from outside the region, which accounted for 13,700 ha. Most of these purchases are of overseas products (12,960 ha) including imported motor vehicles, computers, foodstuffs and various household items. There is only a relatively small amount of land embodied in products imported from other regions (740 ha).

13.5 Ecological Balance of Trade and ecological interdependencies

The land embodied in imports into the Marlborough regional economy is 47,650 ha. Whereas, the land embodied in exports from the Marlborough economy is a massive 529,680 ha (refer to Table 13.3). The Ecological Balance of Trade of the Marlborough economy is therefore 482,680 ha, making it a big net provider of land to other regions and countries.

Table 13.3 Marlborough's Ecological Balance of Trade by economic sector, 1997–98

Economic sector	Imports purchased by the economic sector (embodied ha)	Exports sold by the economic sector (embodied ha)	Balance of Trade (embodied ha)
Interregional trade			
Agriculture	80	39,150	39,070
Forestry	150	9,320	9,170
Fishing and hunting	0	1,510	1,510
Mining and quarrying	10	40	30
Manufacturing	9,200	6,080	-3,120
Utilities and construction	110	550	440
Services	260	2,680	2,420
Domestic final demand	740	0	-740
Interregional Balance of Trade	10,550	59,320	48,770
International trade			
Agriculture	3,230	196,170	192,940
Forestry	220	17,490	17,270
Fishing and hunting	770	3,300	2,530
Mining and quarrying	70	110	40
Manufacturing	11,720	243,210	231,490
Utilities and construction	1,150	40	-1,110
Services	6,980	10,050	3,070
Domestic final demand	12,960	0	-12,960
International Balance of Trade	37,100	470,360	433,260
Total Balance of Trade	47,650	529,680	482,030

13.5.1 Exports and imports by economic sector

Exports of embodied land from Marlborough (529,680 ha) far outweigh imports of embodied land (47,650 ha). The ratio of exports (of embodied land) to imports (of embodied land) is the second highest of any region in New Zealand, indicating the strong orientation of the Marlborough economy to the exporting of land-based products.

The export of agricultural products (horticultural produce, wool) and manufacturing products (processed land based products) is high, respectively accounting for 235,320 ha and 249,290 ha of embodied land. The embodied land associated with either the agricultural (233,320 ha) or manufacturing (249,290 ha) sector products, both exceed the land appropriated for local consumption as indicated by Marlborough's ecological footprint (163,810 ha).

In comparison, the imports into Marlborough are very light with only imports purchased by the manufacturing (20,920 ha), service (7240 ha), domestic final demand (13,700 ha) sectors having any real significance.

13.5.2 Exports and imports by type of land

The Marlborough region is a very large net provider of agricultural land to other regions but far more importantly, internationally to other countries. A massive 477,420 ha of agricultural land is exported internationally out of the Marlborough region (refer to Table 13.4). This is primarily land embodied in sheep and beef products as well as horticultural products. The extensive nature of pastoral farming in Marlborough means that there are comparatively large land multipliers associated with sheep products (eg. wool) exported from the region which in part accounts for the large exports of embodied land.

Table 13.4 Marlborough's Ecological Balance of Trade by land type, 1997–98

Economic sector	Land embodied in imports (ha)	Land embodied in exports (ha)	Balance of Trade (ha)
Interregional trade			
Agricultural land	9,090	46,520	37,430
Forest land	380	9,380	9,000
Degraded land	290	1,060	770
Energy land	790	2,350	1,560
Interregional Balance of Trade	10,550	59,310	48,760
International trade			
Agricultural land	27,730	430,720	402,990
Forest land	1,940	21,200	19,260
Degraded land	1,690	3,920	2,230
Energy land	5,740	14,530	8,790
International Balance of Trade	37,100	470,370	433,270
Total Balance of Trade	47,650	529,680	482,030

The region is also a significant net exporter of forest land (28,260 ha) although this nowhere near approaches the quantity of agricultural land exported. This may significantly increase overtime with increased conversion of farmland to forestry.

Degraded and energy land is more associated with domestic (particularly urban) uses in Marlborough which are relatively insignificant compared with the export-oriented pastoral sector. It is therefore not surprising that the net Ecological Balance of Trade for degraded land (3000 ha) and energy land (10,350 ha) are both relatively insignificant.

13.5.3 Overall picture

Figure 13.1 provides a summary of the overall flows of embodied land of the Marlborough economy. This diagram indicates that firstly Marlborough is very self-sufficient in terms of land with relatively few imports for local household consumption. Secondly, the diagram indicates that Marlborough is very much orientated to international exports with these flows (470,360 ha) outweighing the flows in to local household consumption within the Marlborough region (168,810 ha). Overall, Marlborough exports 529,680 ha of embodied land compared with imports of only 47,650 ha. This gives Marlborough a positive Balance of Trade of 482,030 ha. Marlborough is therefore a very significant provider of ecological capital to outside regions and more particularly to overseas consumers.

Figure 13.1 Flows of embodied land through the Marlborough economy