



## LAND: LAND USE

### Key points

- Natural forest covers about 30 per cent of New Zealand's land area.
- Collectively, low producing and high producing grasslands (likely to be predominantly used for agricultural grazing) cover half of New Zealand's land area.
- Between 1990 and 2008, land-use change occurred on around three per cent of New Zealand's land area.
- Most land-use change was due to the conversion of grassland into forest.
- New Zealand has the second largest proportion of grassland and the sixth largest proportion of forest out of 30 OECD countries.

Land use describes the human activities or economic functions that occur on land.<sup>1</sup> Many environmental, economic and social factors influence how we use our land.<sup>2</sup> In turn, different land uses can affect the environment, economy and society in different ways.

For example, the value of livestock, cropping and dairy farming to New Zealand's economic activity has increased from nearly \$2.7 billion in 1991 to nearly \$5 billion in 2007.<sup>3</sup> However, these land uses may damage soil health<sup>4</sup>, which can lower productivity and increase surface run off.<sup>5</sup> Excess nutrients can run off to fresh water<sup>6</sup> causing excessive plant and algal growth that affects recreational, aesthetic and ecological values.<sup>7</sup> New Zealanders surveyed in 2008 perceive that farming land uses are major pressures on our soils and fresh waters.<sup>8</sup>

In contrast, native land cover set aside for conservation or recreation places less pressure on our environment and is important for plant and animal biodiversity, ecosystem services, and for New Zealanders and visitors to enjoy our natural environment.

This environmental snapshot reports land use in 2008 across 11 classes (table 1). It also reports changes in land use since 1990. Land-use data is derived from the Land Use Carbon Analysis System (LUCAS) mapping, designed so that New Zealand can meet its Kyoto Protocol reporting obligations. LUCAS uses satellite imagery and aerial photographs to map land cover across New Zealand in both 1990 and 2008, from which land use is inferred. LUCAS does not determine the intensity of the different land uses, or how land use intensity has changed over time.

### Current situation

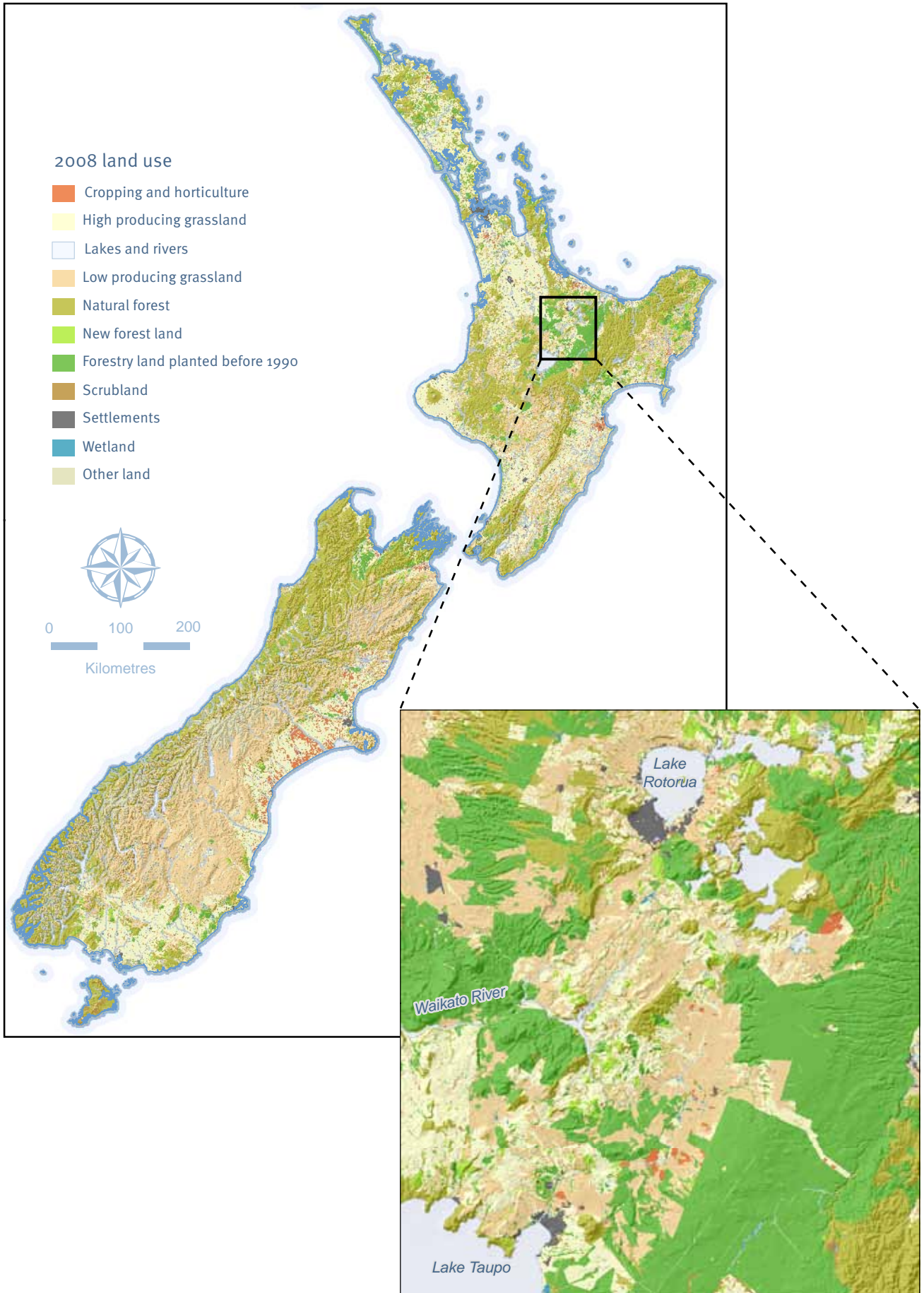
Table 1 and figure 1 show that natural forest covers about 30 per cent of New Zealand's total land area. Scrubland, 'other land' (eg, alpine gravel, snow and ice), lakes and rivers, and wetland cover a further 10 per cent of the country (table 1 and figure 1). In 2009, about 33 per cent of all New Zealand's total land area was legally protected for conservation or recreation purposes.<sup>9</sup> This protected land is expected to have primarily native land cover, which generally occurs within the land-use classes listed above.<sup>10</sup>

Low producing and high producing grasslands cover 29 and 22 per cent of New Zealand's land area respectively. In other words, half of New Zealand's land area is grassland (table 1 and figure 1). Both of these grassland types are likely to have predominantly agricultural grazing land uses, such as sheep, beef or dairy farming.<sup>11</sup> However, some low producing grassland may have conservation or recreational uses.<sup>11</sup> Low producing grassland tends to have low plant growth, and livestock tend to be grazed over large areas.<sup>11</sup> In contrast, high producing grassland tends to have more intensive grazing and farm management practices, such as the use of fertiliser or irrigation to improve the land's productivity.<sup>11</sup>

Forestry land planted before 1990 represents about five per cent of New Zealand's land area. New forest land (ie, land with forest present in 2008 but not in 1990) covers a further two per cent of New Zealand's land area (table 1 and figure 1). Forestry land planted before 1990 and the majority of new forest land are both likely to be used for plantation forestry. However, a small proportion of the new forest land is likely to be forest used for protection purposes (eg, erosion or river control) or regenerating natural forest.<sup>12</sup> Forestry can be a useful option for managing soil erosion.<sup>4</sup> It also provides a sink for greenhouse gases<sup>13</sup> and contributed over \$1 billion to our economy in 2007.<sup>3</sup> However, forest harvesting and replanting must be carefully planned and executed to avoid soil erosion and nutrient losses.<sup>4</sup>

Cropping and horticulture land uses occur on about 2 per cent of New Zealand's land area (table 1 and figure 1). These land uses consist primarily of seasonal crops,<sup>12</sup> for example, vegetables, cereal crops or maize.

+ FIGURE 1  
LAND USE IN NEW ZEALAND, 2008<sup>12</sup>



Settlements represent about 1 per cent of New Zealand's land area (table 1 and figure 1), with over 70 per cent of New Zealanders living in major urban areas.<sup>14</sup> Settlement expansion can result in the irreversible loss of our most versatile soils,<sup>2</sup> and the health of freshwater fish communities tends to be poorer in urban streams compared to streams surrounded by natural forest.<sup>15</sup>

**+ TABLE 1**  
**LAND USE IN NEW ZEALAND, 2008**<sup>10 11 12</sup>

LAND-USE CLASS	DESCRIPTION	AREA (HECTARES)	PERCENTAGE OF TOTAL LAND AREA
Cropping and horticulture	Annual crops or land cultivated for crops. Orchards and vineyards	422,400	2
High producing grassland	Exotic grassland with highly productive vegetation	5,803,100	22
Lakes and rivers	Open waters and riverbeds	529,600	2
Low producing grassland	Exotic and indigenous grassland with lower productivity vegetation	7,705,800	29
Natural forest	Forest and shrub that is not grazed around and is, or could grow to five or more meters tall	8,101,900	30
New forest land	Natural or planted forest present in 2008 but not in 1990	586,600	2
Forestry land planted before 1990	Exotic forest used for either timber production or protection, eg, erosion or river control. Includes harvested areas	1,432,400	5
Scrubland	Scattered scrub within or near grassland not protected or managed for regeneration	1,059,600	4
Settlements	Urban areas, towns and settlements	206,100	1
Wetland	Wetland with vegetation	114,500	<1
Other land	Primarily bare of vegetation and not within settlements, eg, alpine gravel, snow and ice	889,100	3

Notes:

(1) Figures rounded to nearest 100 hectares.

(2) LUCAS mapping focuses on four key land-use classes, ie, natural forest, forestry land planted before 1990, scrubland, and new forest land. All other land uses are determined from pre-existing datasets, such as the Land Cover Database (LCDB) versions 1 and 2 and the New Zealand Land Resource Inventory (NZLRI).

## Trend

About three per cent of New Zealand's total land area changed land use between 1990 and 2008.<sup>12</sup>

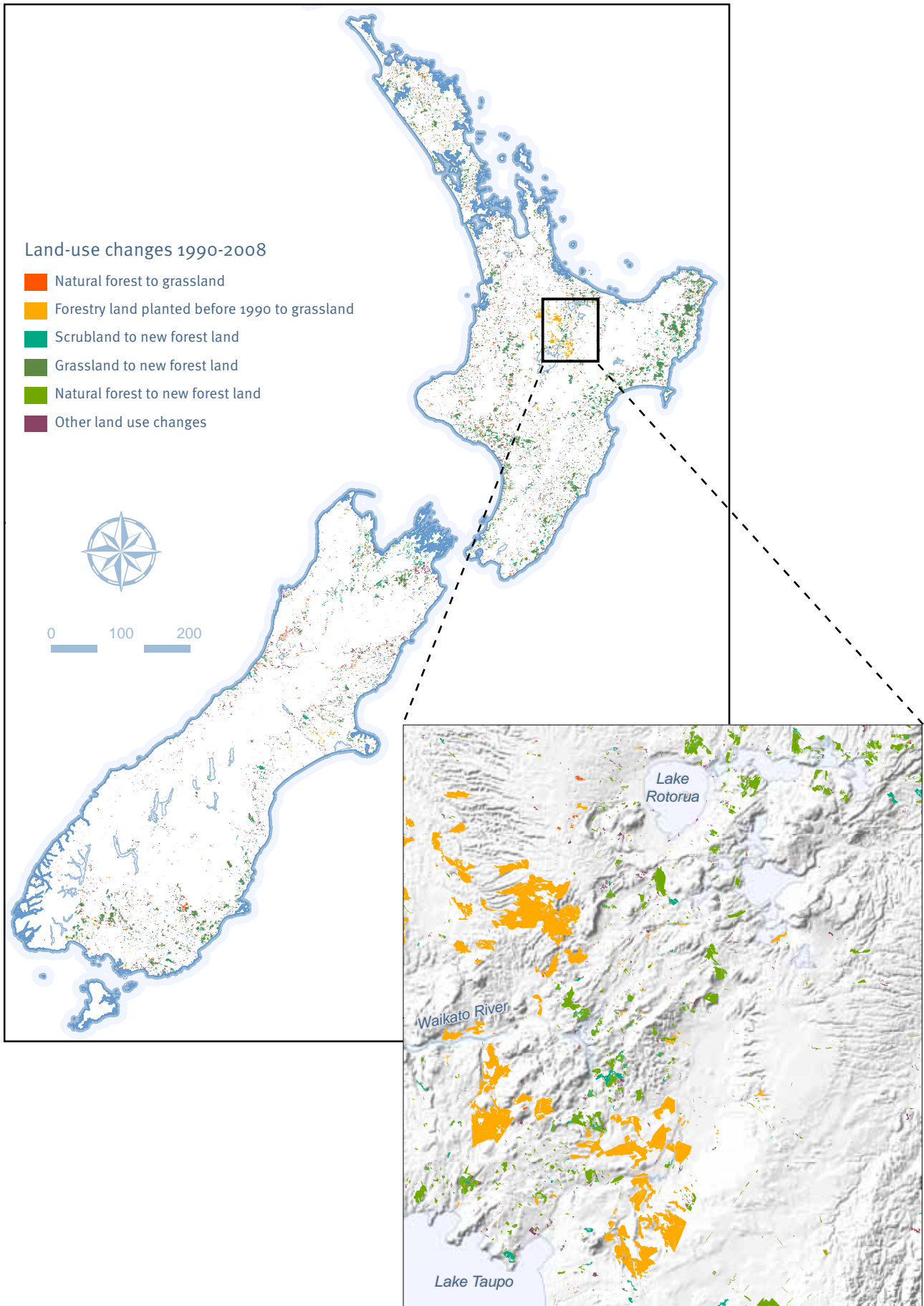
Table 2 shows that about 586,600 hectares of new forest land was detected between 1990 and 2008, while there were about 484,500 and 161,600 fewer hectares of grassland and scrubland respectively. Most of the new forest land is likely to be plantation forestry established on grassland or scrubland, for example, as illustrated around the Rotorua Lakes in figure 2. New plantation forestry and regenerating natural forest may help manage some of the pressures on our soils and fresh waters, and increase plant and animal biodiversity.

Between 1990 and 2008, about 50,700 hectares of natural forest and about 47,900 hectares of forestry land planted before 1990 were deforested<sup>12</sup>; equivalent to nearly one fifth of the area of new forest land. This was predominantly due to conversion of forest to grassland, for example, around Taupo (as illustrated in figure 2), and the conversion of natural forest to planted forest.<sup>12</sup> Deforestation represents a loss of plant and animal biodiversity. Subsequent intensification of deforested land could lead to soil compaction, increase nutrients in our soils and waterways, and increase the risk of soil erosion.<sup>4</sup>

The area of land used for cropping and horticulture has increased by 4,500 hectares since 1990 (table 2 and figure 2). Most of the increase has been from the establishment of horticulture (eg, orchards and vineyards) on cropping and grassland.<sup>12</sup> This coincides with the contribution of horticulture production to New Zealand's economy nearly doubling during this time.<sup>3</sup>

+ FIGURE 2

KEY LAND-USE CHANGES IN NEW ZEALAND BETWEEN 1990 AND 2008<sup>12</sup>



+ TABLE 2

KEY LAND-USE CHANGES IN NEW ZEALAND BETWEEN 1990 AND 2008<sup>12</sup>

LAND-USE CLASS	CHANGE IN HECTARES		
	LOSS	GAIN	NET
Cropping and horticulture	5,000	9,500	4,500
High producing grassland	117,800	64,400	-53,400
Lakes and rivers	0	200	200
Low producing grassland	366,700	55,700	-311,000
Natural forest	50,700		488,000
New forest land		586,600	
Forestry land planted before 1990	47,900		
Scrubland	161,600	36,400	-125,100
Settlements	100	2,800	2,600
Wetland	100	0	-100
Other land	6,500	800	-5,600

Notes:

(1) Figures rounded to nearest 100 hectares.

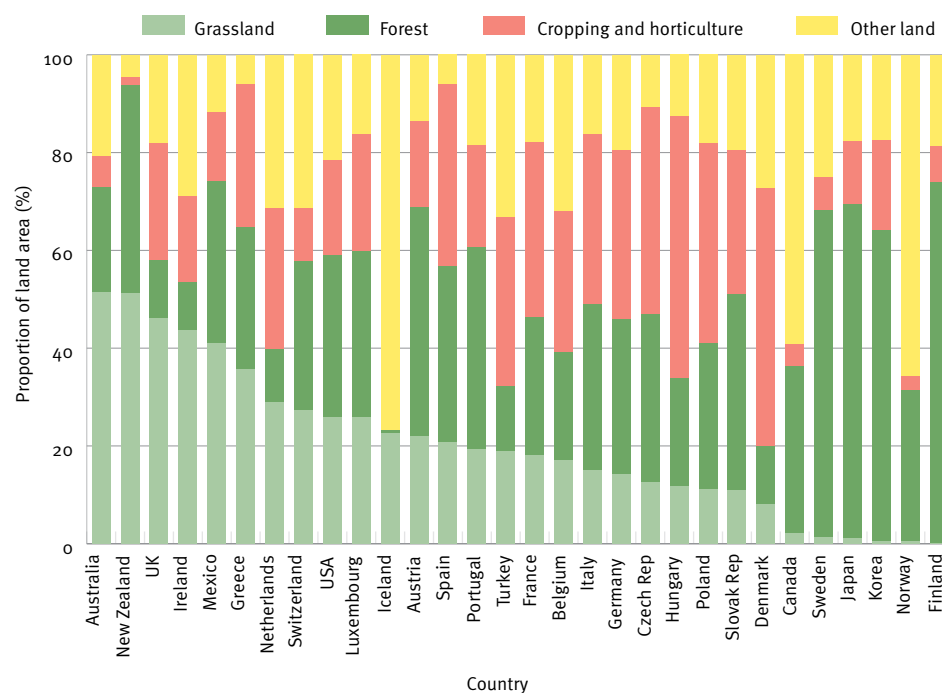
(2) Some net changes do not add due to rounding.

## International comparison

Figure 3 shows that New Zealand has the second largest proportion of grassland out of 30 OECD countries and the sixth largest proportion of forest. The comparatively high proportion of grassland reflects the high contribution of livestock, cropping and dairy farming to the New Zealand economy.<sup>3</sup> In contrast, New Zealand has the second smallest proportion of land used for cropping and horticulture and the smallest proportion of 'other land' (figure 3).

+ FIGURE 3

LAND USES IN OECD COUNTRIES, LATEST AVAILABLE YEAR<sup>12 16</sup>



Notes:

(1) Figure excludes lakes and rivers.

(2) New Zealand figures are from the 2008 LUCAS land-use map data while data for other countries is sourced from the *OECD Environmental Data Compendium 2008: Land*.

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#### FOR MORE INFORMATION:

- about the state of New Zealand's environment see [www.mfe.govt.nz/environmental-reporting](http://www.mfe.govt.nz/environmental-reporting)
- about the Ministry for the Environment's reporting on New Zealand's land use contact Brent King at [brent.king@mfe.govt.nz](mailto:brent.king@mfe.govt.nz) or visit the LUCAS webpage at [www.mfe.govt.nz/issues/climate/lucas/](http://www.mfe.govt.nz/issues/climate/lucas/)
- about New Zealand's land see [www.mfe.govt.nz/issues/land/](http://www.mfe.govt.nz/issues/land/)



#### New Zealand Government

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