

Economic impact assessment of Madagascar ragwort

Final report



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Preface

This report has been prepared for Northland Regional Council by Ana Rodriguez, Jason Webber, and Sam Ponniah from MartinJenkins (Martin, Jenkins & Associates Ltd).

For over 30 years MartinJenkins has been a trusted adviser to clients in the government, private, and non-profit sectors in Aotearoa New Zealand and internationally. Our services include organisational performance, employment relations, financial and economic analysis, economic development, research and evaluation, data analytics, engagement, and public policy and regulatory systems.

We are recognised as experts in the business of government. We have worked for a wide range of public-sector organisations from both central and local government, and we also advise business and non-profit clients on engaging with government.

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Executive summary

Madagascar ragwort is an invasive and poisonous weed that is highly toxic to cattle and horses. It is already causing significant production losses for beef and dairy farmers with up to 35% reductions in carcass weights and 65% losses in milk solids produced per hectare reported on affected properties. It spreads quickly and is difficult to control because it produces thousands of seeds and can spread easily through the wind and by movement on farm equipment, hay, and livestock. Although the current infestation is limited to the top half of Northland, this invasive pest poses a real risk to the entire country due to its ease of spread and the high climate suitability of other regions in the North Island.

Northland Regional Council (NRC), DairyNZ, Beef+Lamb and Pāmu commissioned MartinJenkins to identify the possible range of economic impacts if Madagascar ragwort is allowed to spread untreated. The report focuses on Te Tai Tokerau (Northland), Waikato, and Tāmaki Makaurau (Auckland).

We used an Input-Output Multiplier Analysis to estimate economic impacts under two spread scenarios: low and high human-aided spread. Annual Impacts were assessed for 2035 (short-term) and 2055 (long-term). The assessment covers direct losses to farmers, indirect effects on suppliers, and wider impacts on jobs and local economies.

Estimating the spread of Madagascar ragwort

Landcare Research has developed a preliminary model to indicatively estimate the possible spread path of this invasive pest based on two scenarios. Under a scenario in which there is a low frequency of human-aided spread, the model shows that Northland could see up to 16% of its farmland infested by 2035, while Auckland and Waikato would remain mostly unaffected. Under a higher assumed rate of human-aided spread- meaning seeds are more likely to move between regions via hay, livestock and equipment - Auckland could reach over 55% infestation, Northland 22%, and Waikato over 16% by 2035. By 2055, the low scenario shows Northland could have 34% of its farm area infested, with Waikato and Auckland less than 6%. Under the high scenario, Northland's infestation could grow to 75% of farmland affected, Auckland over 80%, and Waikato nearly 30%.

Economic impacts

Based on the spread assumptions, if Madagascar ragwort is allowed to continue to spread without treatment, total farm revenue could reduce by between \$30 million and \$171 million by 2035 and \$96 million and \$360 million by 2055. These losses would have a significant impact on local economies, with between 222 to 1,200 jobs lost by 2035 and 689 to 2,550 by 2055. Annual GDP could fall by \$22 million to \$132 million in the short term and \$73 million to \$276 million in the long term.

The Government would also stand to lose tax revenue as a result of these impacts, with losses ranging from \$11 million to \$64 million in 2035 and \$36 million to \$134 million in 2055.



Introduction

Context

Northland Regional Council (NRC) and industry partners have jointly commissioned work from MartinJenkins to develop an economic impact analysis and position paper on the preferred approach to managing Madagascar ragwort.

Madagascar ragwort (*Senecio madagascariensis*) is a daisy weed that is highly toxic to cattle and horses. It has yellow flowers and grows rapidly to 20–60 cm tall, becoming woody and shrub like. It grows in a wide range of soils and climates. Each plant can produce up to 10,000 seeds within 6 weeks of germination, and it can germinate all year round. Seeds can be spread by wind or hitchhike on farm equipment, hay and stock moved either within or between regions. These features allow Madagascar ragwort to rapidly and exponentially spread across pasture.

Its resilience to treatment, rapid spread, and the high costs of treatment make it uniquely challenging for individual landowners to manage. While Madagascar ragwort primarily impacts dairy and beef farming, it also impacts other types of farming, the environment, and the connection of iwi/Māori to the whenua.

Purpose of the assessment

This economic impact assessment aims to estimate the economic effects of Madagascar ragwort if it is allowed to spread untreated within Northland, Auckland and the Waikato (the top of the North Island).

It has been commissioned in response to a request from the Primary Production Committee for analysis on the costs to the regional and national economies of allowing the invasive weed to continue to spread without intervention.

Approach

This analysis employs an Economic Impact Assessment (EIA) methodology to estimate the direct, indirect, and induced effects resulting from the spread of Madagascar ragwort. Economic impacts are evaluated in terms of contributions to value added (Gross Domestic Product) and changes in employment, reflecting shifts in economic activity driven by the weed's incursion.

We have also provided a brief commentary on hay, silage and balage. The impacts on this sector and related agricultural sectors are included in the assessment but due to the nature of the analysis, we are not able to isolate and report on impacts on sub-sectors.



Report outlook

This report is split into four sections:

1. It begins by describing the model's methodology and key assumptions.
2. The next section presents the likely impacts on economic activity as a result of the spread of Madagascar ragwort.
3. The final section presents a brief discussion on the potential scale of impact on the hay and silage industries.



Economic impact analysis

Economic impact analysis derives the impact on jobs and GDP in a defined geographic area from the expenditure (either additional or reduced) associated with an activity or event. In this case, the analysis considers the loss in production due to Madagascar ragwort. Our approach relies on Input-Output (I-O) Multiplier Analysis,¹ a well-established and internationally recognised methodology, frequently adopted in New Zealand for assessing the regional effects of organisations, industries, and specific events.

Key measures considered include:

- Output: the impact on gross sector production.
- Employment: The number of jobs generated or lost as a result of production changes, expressed in Full-Time Equivalents (FTEs).
- Value Added (GDP): The incremental or reduced value retained within the local economy, typically comprising salaries, wages, and profits.²

For this assessment, we utilised I-O tables supplied by Butcher Partners Ltd,³ a trusted provider of regional input-output data commonly used in New Zealand's economic impact evaluations.

The method involves identifying new or lost expenditure or production within the study area and applying an I-O multiplier model to estimate resulting changes in employment and value added (GDP).

This process enables us to quantify three categories of economic effects:

- **Direct impacts:** The immediate effects on farmers and landowners experiencing reduced production and productivity.
- **Indirect impacts:** Flow-on effects to suppliers who provide goods and services to those directly affected, as well as further impacts along the supply chain.
- **Induced impacts:** Broader consumption effects resulting from changes in income for employees and business owners throughout the affected supply chains.

¹ I-O multipliers are produced by Statistics NZ and demonstrate the relationships between industries, the goods and services they produce, and who uses them

² Also includes depreciation and indirect taxes.

³ The EIA is based on 2019/20 regional multipliers.



Method and assumptions

The model estimates the economic losses that would occur in a single year once infestation reaches a specified level. We have done this for two time horizons – 10 years (2035) and 30 years (2055).

The method involves two main steps:

- identifying the direct economic losses from the spread of Madagascar ragwort, and
- applying regional multipliers to estimate the indirect and induced effects of those losses on value added (GDP) and employment.

All economic losses are presented in 2025 dollars.

Economic activity

Direct economic impacts were measured as gross revenue losses by region and sector. To estimate these values, we first calculated an annual baseline revenue for each region and applied a production loss per hectare percentage to the infested area. Detailed parameters and assumptions are outlined in the *Revenue loss estimates* section.

Sectors

The assessment focuses on three farming types: sheep, beef, and dairy. For modelling purposes, revenue losses for beef and sheep were combined because separate production loss data for sheep farming was unavailable.

Revenue losses were allocated to two sectors for applying input–output multipliers:

- dairy cattle farming, and
- sheep, beef cattle, and grain farming.

The assessment considers the indirect and induced impact on other agricultural sectors (e.g. hay production) through use of input-output multipliers. As a result, we do not estimate direct impacts on these sectors separately to avoid double counting.

Study area

The analysis covers three regions: Northland, Auckland, and Waikato.

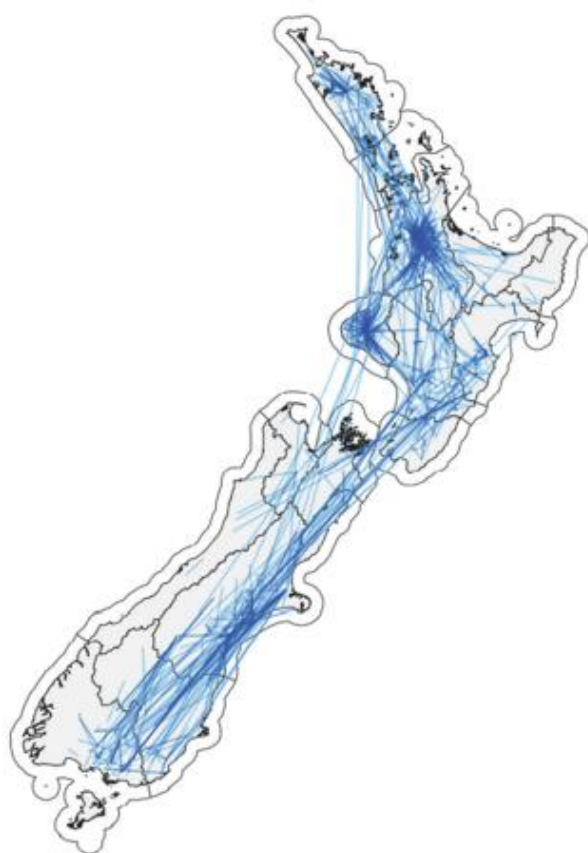
Northland is currently the only region where the weed has been detected, so it is expected to experience the greatest immediate impacts. Auckland and Waikato are included because of their higher risk of infestation, driven by biological factors and human mediated vectors of spread, as



discussed in the section below. Human-mediated dispersal, including livestock movements, is a key consideration in assessing regional exposure.

The map below illustrates the movements of cattle and deer recorded in the National Animal Identification and Tracing (NAIT) programme in a single day (13 May 2021). In one week there were 243,858 movements of 213,172 animals.

Figure 1: Distribution of cattle movements



Source: NAIT, provided by Ministry for Primary Industries

While current infestations are contained to the top of Northland, as infestations become larger and more dense, the potential for faster and wider spread increases. This includes spread through human mediated vectors across regions.



Spread modelling

To estimate the infested farming area by region and year, Landcare research developed a preliminary model. This model uses 2021 farm parcel data to simulate Madagascar ragwort invasions and calculate the proportion of farm area affected in each region. It accounts for natural spread (such as wind dispersal) and human-assisted pathways, scaled using NAIT livestock movement data. Initial infestations are based on sites identified in Northland. The model includes dairy, dry stock, beef, and sheep-and-beef farms with fewer than two sheep per hectare.

Assumptions and timeline

Figure 2 shows areas in Aotearoa where Madagascar weed can thrive, with most of the North Island climatically suitable. In this sense, the spread model assumes all farms in the three regions have an Ecoclimatic Index above 6. It considers both local and long-distance spread, occurring through biological processes and human activity. Two invasion scenarios were modelled based on preliminary work by Landcare research:

- low spread: probability of seed entering human-aided dispersal = 10^{-12}
- high spread: probability of seed entering human-aided dispersal = 10^{-9} .

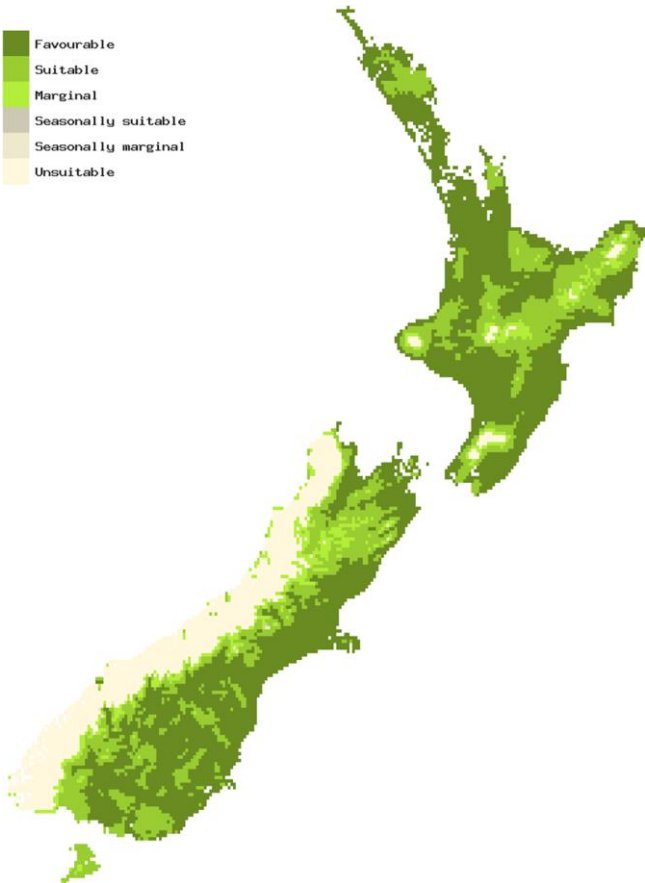
Year one of the model is set as 2005, based on NRC findings of substantial infestations in 2009⁴ which suggest it would have first arrived long before then. Landowner accounts suggest it has been present in the region for between 30–35 years. As a result, 20 years represents a conservative estimate that is likely to have broad consensus.

It is important to note that the rate of spread anticipated in 2025 by the model has not been validated against current rates of infestation given we do not have a full understanding of where Madagascar ragwort has established itself. Further work will be required to build this model further, including validation and alignment with known rates and areas of spread.

⁴ Proposed Plant Pest Management Strategy and Proposed Animal Pest Management Strategy for Northland (2009)



Figure 2: Madagascar ragwort climate suitability



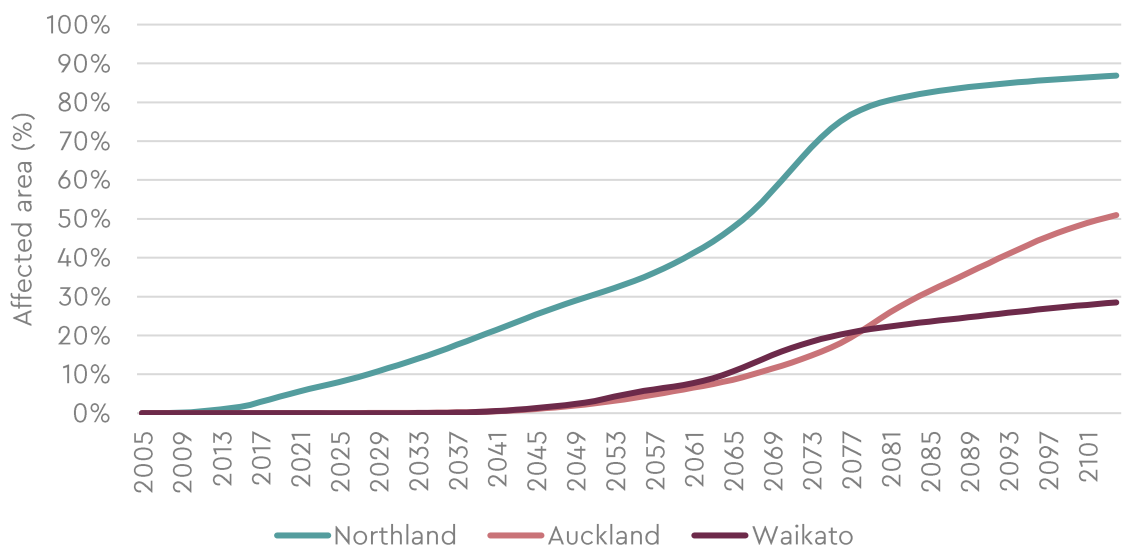
Source: CLIMEX model showing the potential distribution of Madagascar ragwort.

Affected area by scenario

Figure 3 and Figure 4 show the annual percentage of farm area affected across regions under a low spread and high spread scenario. Under the low spread scenario, Northland consistently has a higher proportion of its region infested than Auckland and Waikato. This reflects a lower assumption for human-assisted spread, causing the weed to spread primarily within the Northland region. Under the high spread scenario, Northland experiences higher infestation rates until 2025, after which Auckland experiences a greater proportion of infested regional land. This appears to be driven by the closer proximity of farms in Auckland and the fact Auckland continues to receive invasions from the Northland region in addition to within region spread.

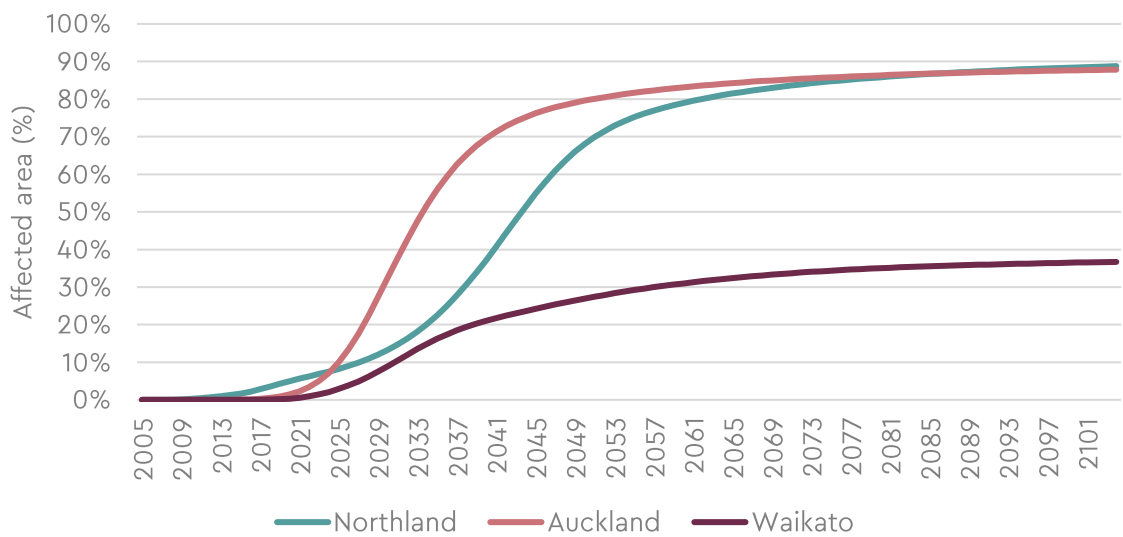


Figure 3: Area affected under a low spread scenario



Source: Landcare model.

Figure 4: Area affected under a high spread scenario



Source: Landcare model.



Sources of information

Baseline revenue and losses were estimated from these sources:

Land use by sector

- Sheep and beef: Stats NZ agricultural and horticultural land use data (2019)⁵.
- Dairy: NZ Dairy Statistics reports- average effective hectares by region, 2021/22–2023/24^{6 7 8}.

Gross revenue per hectare

- Sheep and beef: Average revenue per hectare from the Sheep and Beef Farm Survey (Class 9, All Classes, Northland–Waikato–Bay of Plenty)⁹.
- Dairy:
 - Northland and Waikato - DairyNZ Econ Tracker data¹⁰,
 - Auckland: Average milk solids per effective hectare (last three years) and average sale price (\$/kgMS) from annual Dairy Statistics reports.

Revenue loss estimates

- Sheep and beef: Based on the average decrease in production from the Pāmu case study¹¹.
- Dairy: Based on the average decrease in production from empirical data - dairy farmer testimonies.
- Affected area: Estimated using Landcare research spread model.

EIA scenarios

We assessed economic impacts under low and high spread scenarios for two points in time:

- ten years from now (2035), and
- thirty years from now (2055).

Table 1 summarises the proportion of infested area by region under each scenario.

⁵ [Agricultural and horticultural land use | Stats NZ](#)

⁶ [nz-dairy-statistics-2021-22-web.pdf](#)

⁷ [dairy-statistics-2022-23-book-final.pdf](#)

⁸ [New Zealand Dairy Statistics 2023-24 | DairyNZ](#)

⁹ [Class 9, All Classes, Northland-Waikato-BoP](#)

¹⁰ [DairyNZ Econ Tracker data](#)

¹¹ Pāmu. (2024). Madagascar Ragwort: More than a Northland challenge. Briefing for Minister Andrew Hoggard and Grant McCallum MP



Table 1: Proportion of infested area by year, region and spread scenario

Assessment year	Region	Area infested – Low spread	Area infested – High spread
Ten years from now: 2035	Auckland	0.12%	55.93%
	Northland	15.72%	22.51%
	Waikato	0.05%	16.25%
Thirty years from now: 2055	Auckland	3.92%	81.67%
	Northland	34.00%	75.19%
	Waikato	5.26%	29.20%

Source: Landcare model.

EIA assumptions

The model is based on the following key assumptions that have been agreed with NRC and industry:

- **Unmanaged infestation:** No mitigation activities are undertaken to stop the weed spreading.
- **Definition of infested area:** An area is considered infested if it experiences productivity loss.
- **Farm area stability:** The number of hectares by farm type remains constant over time.
- **Productivity losses:** Losses for sheep farming are assumed to be the same as for beef farming.
- **Revenue per hectare:** Revenue per hectare remains constant over time.
- **Productivity loss per hectare:** Productivity losses per hectare remain constant over time.
- **Regional I-O Multiplier Analysis:** This is a static model that assumes fixed relationships and constant 2025 prices. The multipliers used reflect the economy in 2019/20 and do not account for future structure changes.

Caveats and limitations

The model has a number of limitations that have been agreed with NRC and industry:

- **Spread scenarios:** Results vary significantly across simulations. Uncertainty in biological, environmental, and other conditions may lead to inaccurate spread estimates.
- **Geographic scope:** Although most of the North Island and the top of the South Island are suitable for the weed (Map), the model is limited to three regions.



- **Excluded sectors:** Other affected sectors are excluded. Direct impacts on hay and silage have not been assessed separately although indirect impacts are included in the EIA.
- **Annualised estimates:** The model provides annualised cost estimates only. It does not calculate the net present value of infestation over multiple years.
- **Direct impacts only:** The focus is on farm productivity loss per hectare. Broader impacts on ecosystem services, biodiversity, and social outcomes are not included.
- **Data limitations:** The model uses Rangiputa farm production loss data for beef and other empirical data for dairy. It may not reflect variation across regions, farm sizes, or land classes.
- **Productivity loss basis:** Estimates are based on the reduction in annual production between 2018 (the earliest available data) and 2024. Data from Pāmu reflect years when mitigation had already begun.



Economic impact

This section outlines the indicative economic impact of uncontrolled weed spread over the next 10 and 30 years.

Revenue loss estimates

Regional revenue by sector

The baseline regional revenue by sector was estimated using two key factors:

- the number of hectares by land use area,¹² and
- the average gross revenue per hectare for each sector.¹³

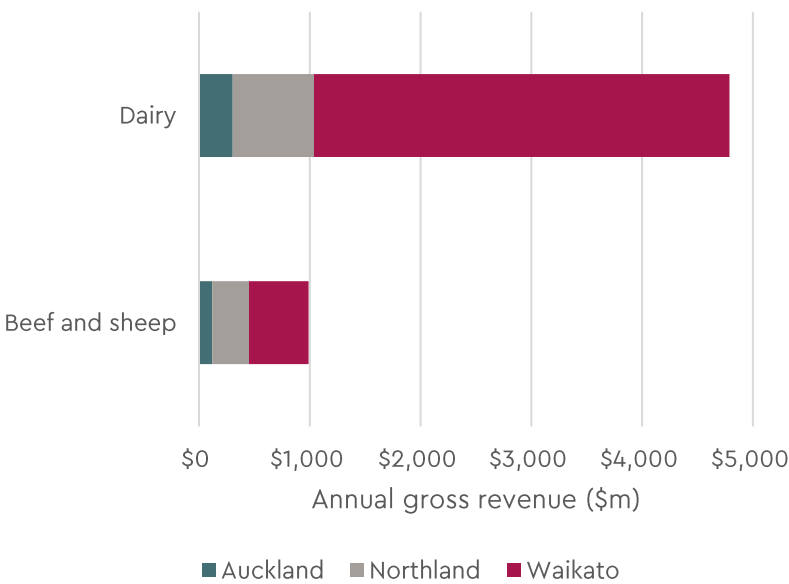
Figure 5 shows the estimated annual gross revenue by region and sector. Combined, the sheep, beef, and dairy sectors are estimated to generate about \$5.8 billion across the three regions each year. Dairy accounts for more than 80% of this total, largely because dairy farms in the Waikato region contribute \$3.7 billion.

¹² Sheep and beef areas are based on [Stats NZ Agricultural and horticultural 2019 land use data](#); dairy areas use the NZ Dairy Statistics average for 2021/22–2023/24.

¹³ Sheep and beef gross revenue is based on the average revenue per hectare from the Sheep and Beef Farm Survey ([Class 9, All Classes, Northland–Waikato–BoP](#)). The same value is applied across all regions. Dairy revenue uses [DairyNZ Econ Tracker data](#) for Northland and Waikato, while Auckland figures are estimated from the last three years' average milk solids per effective hectare and average sale price (\$/kgMS) from annual Dairy statistics reports.



Figure 5: Baseline gross revenue per region and sector (\$m)



Source: MartinJenkins estimates using inputs listed in the Sources of information section.

Table 2: Baseline gross revenue per region and sector (\$m)

Region	Sheep and beef sector	Dairy	Total – Sheep, beef and dairy
Auckland	\$117.8	\$304.8	\$422.6
Northland	\$335.1	\$732.2	\$1,067.3
Waikato	\$536.2	\$3,752.1	\$4,288.2
Total	\$989.0	\$4,789.1	\$5,778.1

Source: MartinJenkins estimates using inputs listed in the Sources of information section.

We benchmarked estimated dairy revenue figures against publicly available payout data from Infometrics. For the 2024/2025 season, the dairy payout for Northland is \$730 million¹⁴ – only 0.3% lower (around \$2 million less) than the modelled revenue for the region. For Waikato, the most recent Infometrics data (2023/2024 season) shows a payout of \$3,697 million,¹⁵ which is about 1.5% lower than the modelled revenue of \$3,752 million (a difference of \$55 million). For Auckland, Infometrics

¹⁴ [Quarterly Economic Monitor | Northland Region | Dairy payout](#)

¹⁵ [Quarterly Economic Monitor | Waikato Region | Report](#)



estimates the 2024/2025 payout at \$208 million,¹⁶ which is 47% lower than the modelled revenue. While this difference is significant, Auckland's contribution to the overall impact is minimal, so we have used the modelled revenue for consistency.

Direct revenue loss

Table 3 shows the estimated direct revenue loss for each sector and region in 2035. Under the low-spread scenario, annual production revenue across all regions and sectors is expected to fall by about \$29 million. Around \$18 million, representing 60% of the loss, will affect Northland's sheep and beef industry.

Under the high-spread scenario, total revenue loss in 2035 could reach \$171.35 million. Waikato's dairy sector would bear about one-third of this impact, approximately \$60 million.

Table 3: Direct revenue losses in 2035 by sector, region, and spread scenario (\$m)

Sector	Region	Low spread	High spread
Sheep and beef	Auckland	\$0.05	\$23.05
	Northland	\$18.44	\$26.40
	Waikato	\$0.09	\$30.49
	All regions	\$18.58	\$79.95
Dairy	Auckland	\$0.04	\$16.49
	Northland	\$11.14	\$15.95
	Waikato	\$0.18	\$58.97
	All regions	\$11.35	\$91.41
Total		\$29.93	\$171.35

Source: MartinJenkins estimates using inputs listed in the Sources of information section.

Notes

1 Assuming revenue per hectare, productivity and land use does not change over time.

Table 4 shows the estimated direct revenue loss for each sector and region in 2055. Under the low-spread scenario, annual production revenue across all the regions and sectors is expected to fall by

¹⁶ [Quarterly Economic Monitor | Auckland | Dairy payout](#)



about \$95.71 million. Northland's sheep and beef sector would bear around 40% of this impact (or around 78% of all Sheep and Beef farms in the three regions), losing just under \$40 million in revenue.

Under the high-spread scenario, the total revenue loss in 2055 would be just under \$360 million. The sheep and beef, and dairy sectors would face similar losses. The dairy sector in Waikato would experience the greatest impact, with an estimated reduction of approximately \$106 million. Northland's sheep and beef sector would also experience significant production impacts, facing losses of just over \$88 million.

Table 4: Direct revenue losses in 2055 by sector, region, and spread scenario (\$m)

Sector	Region	Low spread	High spread
Sheep and beef	Auckland	\$1.62	\$33.66
	Northland	\$39.87	\$88.18
	Waikato	\$9.88	\$54.79
	All regions	\$51.37	\$176.63
Dairy	Auckland	\$1.16	\$24.08
	Northland	\$24.08	\$53.25
	Waikato	\$19.10	\$105.96
	All regions	\$44.34	\$183.29
Total annual loss		\$95.71	\$359.92

Source: MartinJenkins estimates using inputs listed in the *Sources of information* section.

Notes

1 Assuming revenue per hectare, productivity and land use does not change over time.

Regional value added (GDP) and employment impacts

Impacts in 2035

Table 5 summarises the estimated direct, indirect, and induced impacts of Madagascar ragwort under the low spread scenario in 2035. Direct revenue losses in the sheep, beef, and dairy farming sectors across all the regions are projected to reduce GDP by \$13.7 million and result in 174 direct FTEs lost.



When indirect and induced effects are included, the total impact rises to \$22.41 million in GDP and around 222 FTEs annually.

Under the low spread scenario, Northland is expected to experience most, if not all, of the impacts, facing a \$22 million drop in GDP and a loss of 219 jobs.

Table 5: Economic impacts in 2035 under the low spread scenario

Variable	Area	Direct	Indirect	Induced	Direct + Indirect	Direct + Indirect + Induced
Output (\$m)	Auckland	\$0.09	\$0.03	\$0.02	\$0.12	\$0.13
	Northland	\$29.58	\$11.08	\$5.51	\$40.66	\$46.17
	Waikato	\$0.27	\$0.10	\$0.05	\$0.38	\$0.43
	All regions	\$29.93	\$11.22	\$5.58	\$41.15	\$46.73
GDP (\$m)	Auckland	\$0.04	\$0.02	\$0.01	\$0.06	\$0.06
	Northland	\$13.54	\$5.47	\$3.12	\$19.01	\$22.13
	Waikato	\$0.13	\$0.05	\$0.03	\$0.18	\$0.21
	All regions	\$13.71	\$5.53	\$3.16	\$19.25	\$22.41
Employment (FTEs)	Auckland	0	0	0	1	1
	Northland	172	32	15	204	219
	Waikato	1	0	0	2	2
	All regions	174	32	15	207	222

Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

Notes

- 1 These represent one-off nominal impacts in 2035 using static multipliers and revenue assumptions assuming no structural change or productive growth in the economy

Table 6 shows the impacts under the high spread scenario. Direct losses in the sheep, beef, and dairy sectors are estimated at \$80.48 million in GDP and 924 direct FTEs lost. Including indirect and induced effects, the total impact reaches \$131.72 million in GDP and about 1,204 FTEs annually.

In this scenario, Waikato faces the largest losses, driven primarily by the high number of dairy farms in the region.



Table 6: Economic impacts in 2035 under the high spread scenario

Variable	Area	Direct	Indirect	Induced	Direct + Indirect	Direct + Indirect + Induced
Output (\$m)	Auckland	\$39.54	\$14.89	\$7.44	\$54.43	\$61.87
	Northland	\$42.35	\$15.86	\$7.89	\$58.21	\$66.11
	Waikato	\$89.46	\$34.65	\$17.78	\$124.12	\$141.90
	All regions	\$171.35	\$65.40	\$33.12	\$236.76	\$269.88
GDP (\$m)	Auckland	\$18.23	\$7.36	\$4.22	\$25.59	\$29.80
	Northland	\$19.39	\$7.83	\$4.47	\$27.22	\$31.69
	Waikato	\$42.86	\$17.30	\$10.07	\$60.16	\$70.23
	All regions	\$80.48	\$32.48	\$18.76	\$112.96	\$131.72
Employment (FTEs)	Auckland	226	43	20	269	289
	Northland	247	46	22	293	314
	Waikato	451	100	49	551	600
	All regions	924	188	91	1,113	1,204

Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

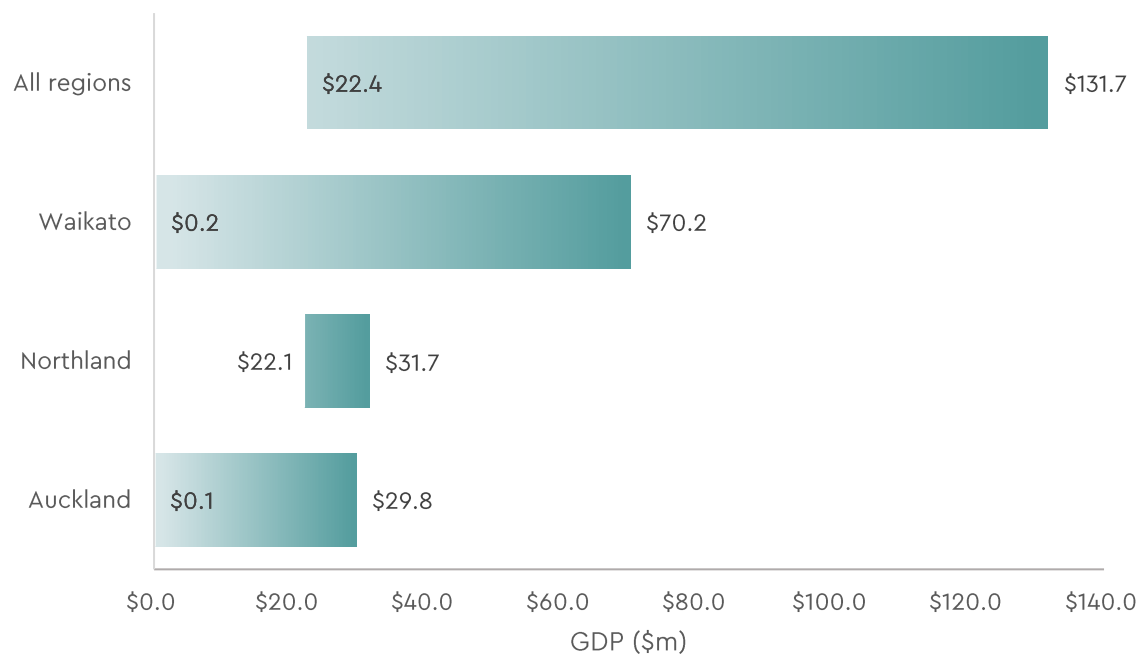
Notes

- 1 These represent one-off nominal impacts in 2035 using static multipliers and revenue assumptions assuming no structural change or productive growth in the economy

Figure 6 illustrates the combined GDP impacts (direct, indirect, and induced) for each region under both scenarios. The figure shows that, over the next 10 years, the GDP impact of allowing Madagascar ragwort to spread untreated in Northland is similar across both spread scenarios. However, the economic impact on Waikato and Auckland varies significantly between the low and high spread scenarios.



Figure 6: Low and high GDP impacts in 2035 by region and total study area



Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

Notes

1 Includes direct, indirect and induce GDP impacts.

Impacts in 2055

Table 7 shows the estimated 2055 direct, indirect, and induced impacts of Madagascar ragwort under the low spread scenario. Direct revenue losses in the sheep, beef, and dairy sectors across all regions are estimated to result in lost GDP of around \$44.5 million. Direct employment impacts are estimated at up to 535 FTEs lost that year. When indirect and induced impacts are included, total losses across the three regions rise to \$72.7 million in GDP and 689 FTEs for 2055.

Under this scenario, Northland would bear a large proportion of the losses, facing nearly a \$48 million drop in GDP (66% of the combined GDP impact) and a loss of 475 jobs (69% of the combined employment impact).



Table 7: Economic impacts in 2055 under the low spread scenario

Variable	Area	Direct	Indirect	Induced	Direct + Indirect	Direct + Indirect + Induced
Output (\$m)	Auckland	\$2.77	\$1.04	\$0.52	\$3.82	\$4.34
	Northland	\$63.95	\$23.96	\$11.92	\$87.91	\$99.83
	Waikato	\$28.98	\$11.23	\$5.76	\$40.21	\$45.97
	All regions	\$95.71	\$36.23	\$18.20	\$131.93	\$150.14
GDP (\$m)	Auckland	\$1.28	\$0.52	\$0.30	\$1.79	\$2.09
	Northland	\$29.29	\$11.82	\$6.75	\$41.11	\$47.86
	Waikato	\$13.88	\$5.60	\$3.26	\$19.49	\$22.75
	All regions	\$44.45	\$17.94	\$10.31	\$62.39	\$72.70
Employment (FTEs)	Auckland	16	3	1	19	20
	Northland	373	69	33	442	475
	Waikato	146	32	16	178	194
	All regions	535	104	50	639	689

Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

Notes

- 1 These represent one-off nominal impacts in 2035 using static multipliers and revenue assumptions assuming no structural change or productive growth in the economy

Table 8 presents the estimated impacts under the high spread scenario. Direct revenue losses in the sheep, beef, and dairy sectors across all regions are projected to reduce GDP by \$168.4 million and cost 1,966 direct FTEs. Including indirect and induced impacts, total losses reach \$275.5 million in GDP and around 2,550 FTEs annually.

Under this scenario, Waikato would experience the largest losses – about \$126.2 million in GDP and 1,078 jobs. Northland would also be heavily affected, losing nearly \$106 million in GDP and 1,050 jobs.

This represents a significant impact on Northland's economy. For context, Northland's GDP is estimated at \$10.6 billion, with about 82,678 people employed. The high spread scenario would reduce the Northland region's GDP by around 1% and employment by just under 1.3%.



Table 8: Economic impacts in 2055 under the high spread scenario

Variable	Area	Direct	Indirect	Induced	Direct + Indirect	Direct + Indirect + Induced
Output (\$m)	Auckland	\$57.74	\$21.74	\$10.87	\$79.48	\$90.35
	Northland	\$141.43	\$52.98	\$26.37	\$194.41	\$220.78
	Waikato	\$160.75	\$62.27	\$31.95	\$223.01	\$254.97
	All regions	\$359.92	\$136.98	\$69.19	\$496.90	\$566.09
GDP (\$m)	Auckland	\$26.62	\$10.74	\$6.16	\$37.36	\$43.52
	Northland	\$64.76	\$26.14	\$14.94	\$90.90	\$105.84
	Waikato	\$77.01	\$31.08	\$18.10	\$108.09	\$126.19
	All regions	\$168.39	\$67.96	\$39.19	\$236.35	\$275.54
Employment (FTEs)	Auckland	330	63	30	393	423
	Northland	824	153	72	977	1,050
	Waikato	811	179	88	990	1,078
	All regions	1,966	394	190	2,360	2,550

Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

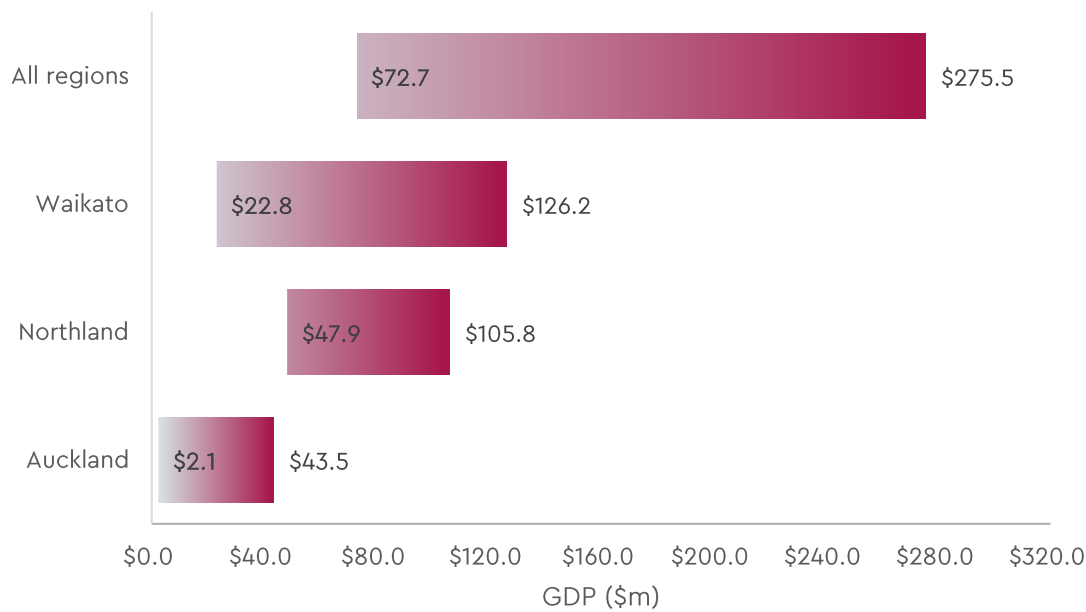
Notes

- 1 These represent one-off nominal impacts in 2035 using static multipliers and revenue assumptions assuming no structural change or productive growth in the economy

Figure 7 illustrates the combined GDP impacts (direct, indirect, and induced) for each region under both scenarios. It shows that over the medium to long term (30 years), the economic cost of Madagascar ragwort varies substantially depending on the scenario.



Figure 7: Low and high GDP impacts in 2055 by region and total study area



Source: MartinJenkins estimates using regional multipliers and inputs listed in the *Sources of information* section.

Notes

1 Includes direct, indirect and induce GDP impacts.

Tax losses from direct, indirect, and induced impacts

Reduced activity in the sheep, beef, and dairy farming sectors would translate to a substantially lower taxation revenue for Government if Madagascar ragwort spreads without adequate control. Lower business output means less taxable income, while job losses and lower wages reduce personal income tax contributions. Declines in indirect and induced spending further reduce GST collections. Together, these effects represent a substantial fiscal impact, highlighting the wider consequences of Madagascar ragwort beyond farm-level profitability.

Table 9 summarises the indicative tax losses that could occur if Madagascar ragwort spreads unmanaged by 2035 and 2055 under the low- and high-spread scenarios. The estimates show tax losses ranging from \$11.1 million to \$134 million. Across all scenarios, most tax losses (around 75%) result from reductions in taxable business income. GST losses account for about 18%, and personal income tax losses about 6%.



Table 9: Total tax losses by year and spread scenario

Year and spread scenario	Reductions in taxable business income	Income tax loss	GST loss	Total tax losses
2035-low spread	\$8.38	\$0.63	\$2.1	\$11.1
2035-high spread	\$47.98	\$3.72	\$12.1	\$63.8
2055-low spread	\$26.80	\$2.05	\$6.7	\$35.5
2055-high spread	\$100.78	\$7.78	\$25.3	\$133.9

Source: MartinJenkins estimates. Sources and approach are detailed in the notes below.

Notes

- 1 Reductions in taxable business income are estimated as the loss in direct output under that scenario multiplied by the 28% business tax rate. Full pass through of the loss of output on taxable business income is assumed.
- 2 Income tax losses are estimated by taking the number of indirect and induced jobs lost, multiplying by the median annual agricultural earnings (\$63,960),¹⁷ then applying a 20.8% tax rate.¹⁸
- 3 GST losses are calculated at 15%.
- 4 All estimates assume no changes to policy or tax over time.

¹⁷ LEED Median earning for the agricultural sector, 2024 Q3.

¹⁸ [OECD Taxing Wages 2025: New Zealand](#)



Other impacts – Hay and silage

Madagascar ragwort threatens hay and silage production because it contains pyrrolizidine alkaloids, which stay toxic even after drying.¹⁹ Contaminated feed can cause irreversible liver damage in cattle and horses, leading to photosensitivity, jaundice, weight loss, and death. Hay and silage from infested areas can also spread the weed and pose major contamination risks. Considering these factors, farmers may turn to source feed from other regions, affecting local hay and silage industries.

Uncertainty around regional value of hay and silage

Estimating the value of the hay and silage industries is complex. For example, Figure 8 shows the area harvested for pasture and lucerne (hay, silage, and balage). However, the agricultural production surveys cover all businesses engaged in agricultural activities²⁰ – including livestock, cropping, horticulture, and forestry – so it is unclear whether the production is sold or used on-farm.

Pasture production per hectare varies not only by season and weather conditions but also within and across regions. Research in Northland illustrates this variation: Dargaville recorded the highest mean annual pasture yield at 11,900 kg DM/ha, compared with 9,970 kg DM/ha in Kaitia and around 8,400 kg DM/ha in Kaikohe and Whangārei.²¹ Overall, these figures suggest that pasture production in Northland is lower than in other regions of New Zealand.

Estimating the industry's regional value is further complicated by price variability over time and between product types. For instance, DairyNZ's *Supplementary Feed Guide* (2020) lists hay at \$80 per 300 kg bale and lucerne hay at \$130 per 300 kg bale.²²

Despite these challenges, we can consider the size of the hay and silage industry in the study regions to illustrate the potential order of magnitude of the direct economic effects of allowing Madagascar ragwort to spread untreated.

Area harvested for hay, silage or balage

Figure 8 shows the total area harvested for hay, silage, or balage in each region, along with the share of total agricultural land used for these purposes. Of the three study areas, Waikato has the largest harvested area – around 160,000 hectares, or 10% of its agricultural land. Waikato is also the second-largest region nationally for these crop types, just behind Canterbury. This highlights Waikato's strong

¹⁹ Barr, J., & Arcus, N. (2025, March 12). Madagascar Ragwort Update. Biosecurity and Biodiversity Working Party, Northland Regional Council. Authorised by D. McKenzie. Unpublished

²⁰ [Agriculture - All agricultural production statistics for total New Zealand 1935-2024 - Figure.NZ](#)

²¹ [A review of pasture yields and growth rates in Northland](#)

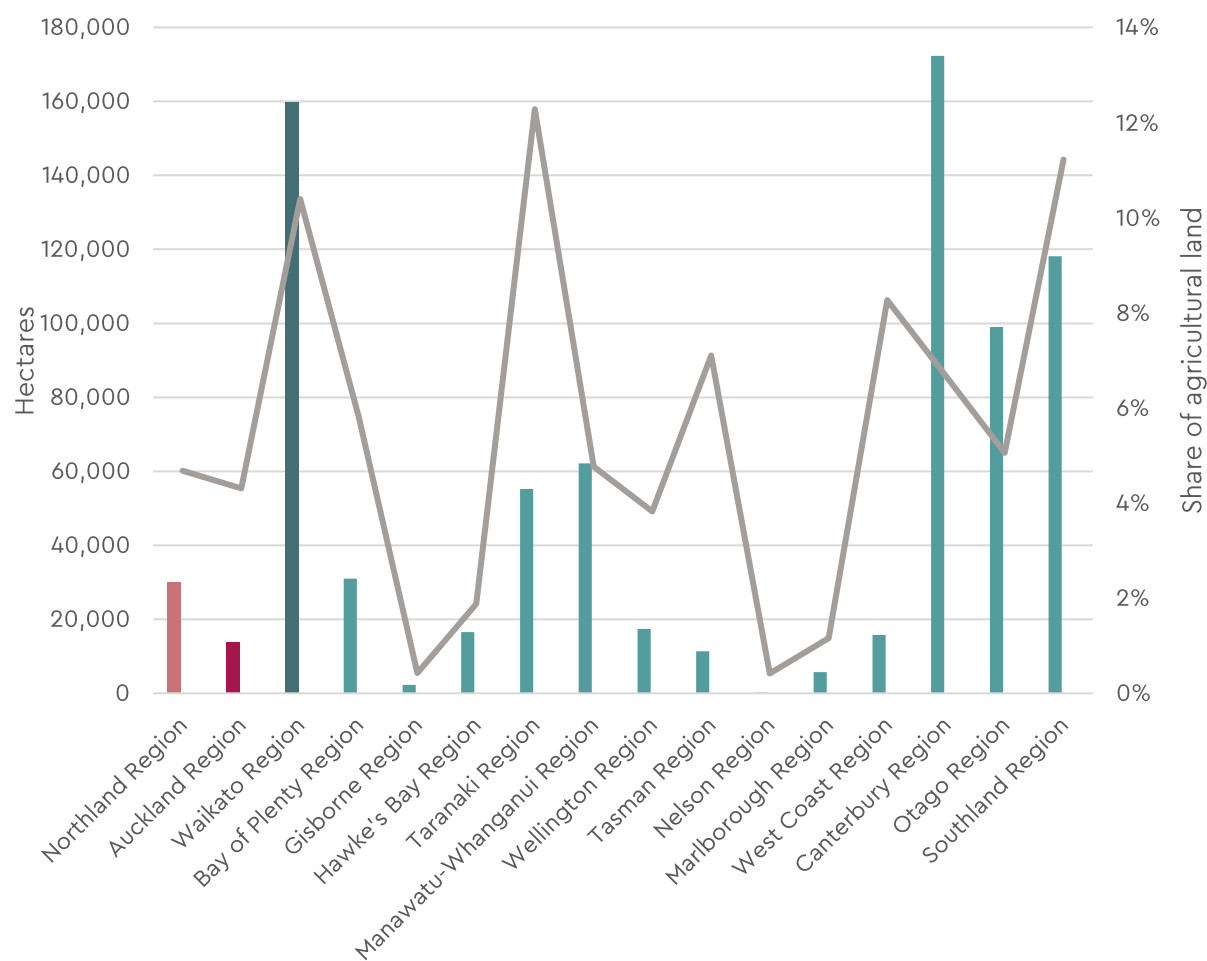
²² [fact-sheet-260-Cost of Feed.pdf](#)



role in national production of feedstock and therefore another significant way in which Madagascar ragwort could impact on the region's economy.

Northland and Auckland have more moderate harvested areas – about 30,000 hectares and 13,600 hectares respectively – each representing around 5% of their agricultural land.

Figure 8: Area harvested for Pasture/lucerne (hay, silage and balage) by region



Source: Stats NZ, Agricultural production statistics, June 2022. [agricultural-production-statistics-year-to-june-2022-final-results-by-regional-territorial-authority-and-farm-type-revised.xlsx](#)

Regardless of whether the harvest is sold or used for livestock feed, if Madagascar ragwort is allowed to continue to spread, it could potentially require farmers to source feed from uncontaminated regions, with the associated added costs of transporting these.



Appendix 1: Total hectares by farm type

Sector	Region	Area	Source
Dairy	Auckland	37,178	New Zealand Dairy Statistics (2021/22 to 2023/24 land area average)
	Northland	105,607	
	Waikato	368,272	
Sheep & Beef	Auckland	95,129	Agricultural and horticultural land use Stats NZ (2019 Sheep + beef land use area)
	Northland	270,663	
	Waikato	433,122	



Appendix 2: Annual gross revenue per hectare

Annual average gross revenue per hectare by sector from 2021/22 to 2023/24 (refer to the *Sources of information* section for raw data).

- Beef and sheep – all regions: \$1,238
- Dairy – Auckland: \$8,199
- Dairy – Northland: \$6,933
- Dairy – Waikato: \$10,188



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