

Institute for Business Research, University of Waikato



Waikato Management School
The University of Waikato
Private Bag 3105
Hamilton 3240
New Zealand

**The Economic Contribution of Kiwifruit Industry Expansion to the Bay of
Plenty, Northland and New Zealand Economies**

**A report prepared for
Zespri International Limited (“Zespri”)
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Authors: Frank Scrimgeour, Warren Hughes and Vijay Kumar

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Executive Summary

This report estimates the economic contribution of the kiwifruit industry to two regions within New Zealand and projects the impact of industry expansion associated with new varieties.

The reports focuses on the period from 2015/2016 through to 2029/30. It addresses the economic contribution, the employment contribution and the Māori contribution to this industry. The focus is estimating the economic benefit deriving from new cultivars.

The estimates were made using a 106-sector economic model.

Traditional input-output modelling is complemented by projections based on industry forecasts of production of different varieties of kiwifruit. The economic models were constructed from data for the year ended March 2015 originating with Statistics NZ.

The kiwifruit industry makes a significant contribution to the BOP regional economy.

The total impact of kiwifruit production on the BOP region for the year 2015/2016 was:

- Revenue: \$1.97b;
- Net household income: \$368m; and
- VA to GDP: \$ 867m.

The kiwifruit industry also makes a significant contribution to the Northland regional economy.

The total impact of kiwifruit production on the Northland region for the year 2015/2016 was:

- Revenue: \$69.53;
- Net household income: \$13m; and
- VA to GDP: \$ 30.6m.

The kiwifruit industry also makes a significant contribution to the New Zealand economy.

The total impact of kiwifruit production on the New Zealand for the year 2015/2016 was:

- Revenue: \$5.5b;
- Net household income: \$1.13b; and
- VA to GDP: \$2.6b.

The kiwifruit industry contributes significantly to employment in the BOP region.

It is estimated that kiwifruit industry provided employment for 10,762 FTE in the BOP region in the 2015/2016 year.

The kiwifruit industry also makes a significant contribution to employment in the Northland regional economy.

It is estimated that kiwifruit industry provided employment for 380 FTE in the Northland in the 2015/2016 year.

The kiwifruit industry benefits from significant Māori investment and benefits Māori through both employment, and returns on investments.

It is estimated that Māori have investments in the industry totalling more than \$300m. It is also estimated there are at least 2,475 FTE of Māori employed in the industry. This has positive spillover effects on other Māori business.

The kiwifruit industry is projected to grow significantly given current projections of the potential for new kiwifruit varieties.

Total NZ production of kiwifruit is projected to increase from 120m trays to 253m trays (111% increase) by 2029/30.

The projected growth of the industry will contribute significantly to the BOP regional economy.

This industry growth is expected to increase BOP GDP from 867m to 2.04b by the 2029/30 year.

Likewise it is estimated that kiwifruit industry growth will contribute significantly to the Northland regional economy.

This industry growth is expected to increase Northland GDP by from 30.6m to 72m by the 2029/30 year.

It is estimated that the kiwifruit industry growth will enhance employment in the BOP region.

This industry growth is expected to increase BOP employment from 10,762 to 25,091 FTE by the 2029/30 year.

Likewise it is estimated that the kiwifruit industry growth will enhance employment in the Northland region.

This industry growth is expected to increase Northland employment from 380 FTE to 886 FTE by the 2029/30 year.

Māori currently benefit from the industry and their benefits are expected to increase significantly through time.

Revenues are estimated to increase from 118.2m to 278m by the 2029/30 year. In addition it is estimated that BOP Māori wages and salaries will increase from \$22.1m to \$52m by the 2029/30 year.

The impact of the Kiwifruit industry is significant for the overall economy of New Zealand and extends far beyond the export receipts generated.

The kiwifruit industry is a leader in horticulture practice and in international marketing. This expertise and scale provides positive externalities to the wider New Zealand economy.

The existing kiwifruit has benefited substantially from new variety development.

New cultivars have diversified grower income streams, enhanced marketing strategies and enabled the industry to overcome the PSA crisis.

Future benefit growth is primarily derived from new cultivars.

New cultivars generated in the First Partnership (Gold 3) are expected to create 8,328 new jobs and \$1,291m in the rural industry by 2030, and \$310m for regional Iwi on an annual basis. These benefits could be enhanced by further cultivar development.

These estimates are provisional and based upon a limited set of assumptions.

The authors expect these estimates to be revised as industry analysts consider assumptions and gain further insights as to the commercial potential for different cultivars of kiwifruit.

The Economic Contribution of Kiwifruit Industry Expansion to the Bay of Plenty, Northland and New Zealand Economies

Introduction

The kiwifruit industry is a significant contributor to both regional economies and the national economy. The development of new varieties has potential to substantially increase that contribution. The challenge is to build robust analysis that accurately characterises the benefits for the industry, Māori and the wider community.

The purpose of the research is to estimate the economic contribution of the kiwifruit industry and how this will change through time as a result of additional varieties. The study addresses the work in a manner consistent with a Vision Mātauranga framework, and its commitment to Māori knowledge, resources and people.

This report utilises Zespri production forecasts by variety to 2030. The estimates are made using a 106-sector economic model developed by Professor Hughes. The 106-sector economic model quantifies the inputs it receives from all other sectors such as Electricity Distribution in order to produce the goods and services sold in a given period (output level in dollars) usually a year. The Input/Output models provide detailed information concerning:

- The structure of the NZ and/or regional economies as to the most important sectors in the economy in terms of employment, profitability, exports out of the country/region etc.
- The impact of a change originating in one sector (e.g. *Meat Processing*) and its implications for other related sectors (e.g. *Road Transport*) and the national/regional economy as a whole.
- The implications for the regional and national environment of significant increases in the output level of any sector or group of sectors (e.g. *Dairy Farming* with dairy conversions as in the recent past).

Furthermore, this report estimates the employment contribution of the kiwifruit industry to the wider New Zealand community from additional kiwifruit cultivars. In addition, estimation of Māori investment and employment is undertaken using data on Māori orchards and kiwifruit businesses. The analysis is enriched by utilising the data obtained from Zespri and public sources.

The report consists of seven sections. The first section provides context to the study. The second section explains the methodology. The third section presents the current economic contribution of the industry. The fourth section presents the future economic contribution of the industry. The fifth section presents the current and future economic contribution of new varieties. The sixth section discusses other considerations and the final section provides the conclusions.

Context

The kiwifruit industry is the largest component of the New Zealand horticulture industry, by both export value and volume (HEA, 2014). Despite the negative consequences of Psa on Kiwifruit production, the exports of the industry remain in excess of NZ\$1 billion representing more than 40% of all horticulture export (NZTE, 2016).

Table 1: Industry Descriptors 2016

Estimated Descriptors	2016
Trays submitted (million)	> 100m
Trays sold (million)	> 100m
Yield (trays/ha)	> 9000
Planting (ha)	> 12,000
Growers	> 2,500
Packhouses	> 40
Coolstores	> 70

(adapted from HEA, 2014)

This production and marketing activity involves commercial entities predominantly located in northern New Zealand.

Kiwifruit and regional economic development

When interpreting the kiwifruit industry prospects it is important to note the New Zealand economy is made up of diverse regions, each with distinct strengths and challenges, depending on local natural resource, infrastructure and people (MBIE, 2015). In order for the country to realise its full economic potential it is critical that all the regions are thriving. Hence MBIE regards regional economic development as a priority. A Regional Growth Programme has been commissioned jointly by the MBIE and the Ministry for Primary Industries (MPI), working in partnership with other central government agencies and regional stakeholders, such as

businesses, iwi, economic development agencies and councils. This programme addresses export markets, investment, innovation, skilled and safe workplaces, natural resources and infrastructure.

Clearly kiwifruit is an important industry that has significant potential to contribute to the regional growth aspirations of Government. It is already playing a major role in the Bay of Plenty (BOP). The BOP is an important horticultural region within New Zealand. The BOP community has a population of 321,000 accounting for about 7% of total population in New Zealand (MBIE, 2015). The BOP region contributes 5.7% of New Zealand GDP and 6.6% of New Zealand employment. One valuable contribution of the kiwifruit industry is that it provides employment throughout much of the region and not just in Tauranga and its immediate environs.

However, many in regions outside of Auckland there is considerable concern as to mechanisms to sustain economic and employment growth. For example, Northland is rich in natural resources and cultural heritage, but its geographic remoteness, low population density and low labour force participation have contributed to lower than average economic performance (MBIE, 2015).

Hence kiwifruit production is of economic significance in Northland where currently around 3.6m trays are produced every year. Northland is famous for its subtropical climate and attractive environmental niches which leads to a diversity of crops being produced in the area. Utilising this opportunity for an expanded kiwifruit industry aligns with regional development aspirations and complements tourism and other initiatives. Further opportunities for significant kiwifruit contributions exist in Gisborne, Hawkes Bay and other parts of the North Island and the Motueka area in the South Island.

Zespri

Zespri International Limited (Zespri) was formed in 1997 as a global marketing organisation, providing a united grower-owned platform to deliver quality New Zealand-grown kiwifruit to the world. Zespri is the largest marketer of kiwifruit with 30 percent share of the global volume. In 2015/16 Zespri sold 116 million trays of premium-quality NZ grown Zespri kiwifruit.

This exploration of innovation to provide new varieties should be interpreted in the light of Zespri's overall strategy. The company is actively investing in health research; marketing the

health benefits of kiwifruit; growing brand awareness; securing innovation across the value chain; enhancing taste and consistency; and supply chain improvement.

With its ambition to be the retail category leader in kiwifruit, Zespri pursues excellence in: brand-based consumer focus; customer relationships and innovation; and cost-effective sourcing of superior fruit globally. It seeks to create a worldwide, year round supply of kiwifruit. Zespri's headquarters are located in Mount Maunganui in the Bay of Plenty.

Current developments are built on a history of investment. Historical developments have been well catalogued elsewhere (Kilgour, Saunders, Scrimgeour, & Zellman, 2008; Brash, 2014; Milne, 2014). The most recent shock was the impact of the Psa disease. This can be seen in the reduced gold kiwifruit production from 2012 to 2014 and the significant industry stress during this period. After emerging from the impact of Psa, the industry is back on track for growth. Contemporary performance as viewed by external sources can be seen in the Annual Review of the World Kiwifruit Industry (Belrose Inc., 2016). It is important to recognise the industry consists of multiple firms and organisations that have many interrelationships. Orchardists produce the fruit. However many orchards make extensive use of contract labour and management or advisory expertise to operate their orchards. Fruit from the orchards are prepared for export by postharvest processors. Zespri is responsible for marketing approximately 98 percent of the global export crop, other than to Australia, with the other 2 percent handled by collaborative marketers (Scrimgeour and Locke, 2015).

Significance of anchor industries

Over recent decades processes of agglomeration within economies has resulted in ongoing rural depopulation in the regions away from the major metropolitan areas except for where tourist or “anchor” industries attract or sustain employment. Kiwifruit is a significant anchor industry in this respect in that production can only relocate to other areas with the appropriate biophysical environment to grow kiwifruit. Further, kiwifruit production is intensive and even with modern technologies generates significant demand for labour and specialist services. The benefits of the kiwifruit industry as an anchor are amplified by the range and quality of inputs the industry attracts. It engages significant management and science informed employment capacity. Further, many of the skills the industry demands have positive spillover effects on other horticulture industries. In addition the strong linkages with the industry in other parts of the country means

there is significant knowledge flow between the regions and this way strengthening regional human capital.

The Economic Model

This review provides a brief non-technical description of the 106-sector Input/Output model used to generate the general equilibrium economic impact (resulting impacts after all reactions to initiating events, industry developments etc. are accounted for) on the New Zealand economy as well as any regional economies such as the Auckland City economy, the Bay of Plenty Regional Council economy, Waipa District Council economy etc. that may be affected by the activity under analysis.

The economic models were constructed from data originating with Statistics NZ for the year ended March 2013. For the current study, the 2013 data have been updated to the year ended March 2015 and the GDP for the BOP for that year was \$12.292b. The NZ economy and all regional economies were categorised into 106 sectors (see below and *italicised* for easy identification). They comprise the basic farming sectors such as *Sheep Beef & Grain Farming*, *Dairy Farming*, *Other Farming* (poultry, pigs, goats, horses etc.), *Horticulture & Fruit Growing*, *Agriculture Forestry & Fishing Support Services* and similar. There are eleven such primary sectors in the model up to *Exploration & Other Mining Support Services*. Related follow-on sectors to these primary producers that are important for rural regional economies include *Meat Processing*, *Seafood Processing*, *Dairy Product Manufacturing*, *Fruit Cereal & Other Food Manufacturing* (vegetables, fish, confectionery), *Beverages & Tobacco* and two sectors related to clothing and footwear manufacturing and another two sectors related to wood processing, pulp and paper manufacturing. Altogether there are twenty-two manufacturing sectors including the primary processing sectors above as well as *Machinery Manufacturing*, *Transport Equipment*, *Electronic & Electrical Equipment Manufacturing* etc. There are five utility sectors as in *Electricity Generation*, *Electricity Distribution*, *Gas*, *Water* and *Sewerage & Drainage Services*. Construction is sub-divided into four sectors including *Construction Services* (e.g. paving, pools, wiring, plumbing, roofing, landscaping). The models then use sixty-one sectors covering a variety of wholesale and retail trade sectors, seven transportation sectors, twenty-five finance and business service sectors, central and local government services as well as separate sectors for

Preschool Education, School Education, Tertiary Education and Adult Education, Hospitals, Community Care Services, Sport & Recreation and similar.

These comprehensive economic models comprise a class of so-called general equilibrium economic models labelled Input/Output models. Each of the 106 sectors in a model quantifies the inputs it receives from all other sectors such as *Electricity Distribution* in order to produce the goods and services sold in a given period (output level in dollars) usually a year. Also quantified are the total inputs of labour and capital goods (depreciation or capital replacement) needed to produce at that output level. The models are constructed for the latest year for which comprehensive statistics have been collated by Statistics NZ. The Input/Output models provide detailed information concerning:

- The structure of the NZ and/or regional economies as to the most important sectors in the economy in terms of employment, profitability, exports out of the country/region etc.
- The impact of a change originating in one sector (e.g. *Meat Processing*) and its implications for other related sectors (e.g. *Road Transport*) and the national/regional economy as a whole.
- The implications for the regional and national environment of significant increases in the output level of any sector or group of sectors (e.g. *Dairy Farming* with dairy conversions as in the recent past).

There are four economic impacts that can be analysed for the national or regional economies as follows:

- Total sales revenue, turnover or output level in dollars.
- Net household income after tax, ACC charges, superannuation and other saving in dollars.
- Employment count.
- Value Added for the region (defined below) otherwise known as Gross Regional Product (GRP) or regional GDP. Gross domestic product or GDP is the equivalent national measure for all NZ.

Although total sales or output best measures the dollar value of total economic activity in a region, it can be inflated by the value of large imports of products or services (e.g. power turbines) into a region such as the Waikato from say Auckland or overseas. While the sales

or revenue figure measure total transaction value, the Value Added or GRP value quantifies the economic value in dollars created with a region such as Waikato by local businesses and their workforces after allowing for any necessary imports of raw materials and other goods and services from outside the region. This is the measure of GRP for a regional economy and ultimately inputs into NZ's GDP and best reflects the true gain to the regional economy. The Value Added measure includes:

- Net after-tax wages and salaries for employees.
- Net after-tax business operating surpluses but before dividends and interest paid by businesses.
- Capital replacement of plant and equipment used up in current production.
- All taxes paid to government as in PAYE, company tax, GST, excise and customs taxes, road user charges and all similar taxes paid to central government.

Value Added can be considered the total return from any activity or event received by workers (wages), businesses (profits) and government (taxes).

Net after-tax wages and salaries (or net household income) is the best measure of available household purchasing power. Strong growth or impact for this measure in a region signals improved prospects for all wholesale and retail trade sectors as well as for sectors like *Construction Services* (e.g. house additions or renovation) and similar sectors.

A wealthy country or region may show acceptable outcomes for the three dollar measures above but may lack the industrial capacity to support significant job growth in say the region. Employment is therefore an important attribute of regional prosperity and this means economic development within the region may be required to expand opportunities for a regional workforce. Such employment is measured in the economic models as employment count. An important capital intensive facility such as a port or airport may itself need only a moderate workforce (direct employment) for efficient operation. Through the facility's linkages to other sectors, however, it can ensure profitability to those sectors and drive significant employment growth in those sectors (e.g. *Horticulture & Fruit Growing* which includes floriculture, strawberries, asparagus etc.) by facilitating immediate transport to high value markets for any NZ region either to overseas markets or other NZ regions.

The so-called general equilibrium (includes all subsequent reactions to initiating economic stimuli) nature of the 106-sector Input/Output model is designed to reflect the idea that employment in any one sector generates employment in other sectors of the economy/region being analysed. From employment, related benefits such as income, value added etc. follow. As employees in the initiating sector build houses and educate their families in the general course of living, they create demands for goods and services that must be satisfied by other sectors with their own employees. In turn, these employees create yet further demands in other sectors and so on. In economic jargon, these successive rounds of impacts are labelled round-by-round effects with some activities down the line requiring yet further services and employment from the initiating sector. The resulting general equilibrium impacts (Revenue or Output, Net Household Income, Value Added and Employment) are estimated by the Input/Output methodology and account for all rounds of economic activity. Modern computers and software have made these calculations now routine.

Using accurate data from Statistics NZ, credible estimates of the economic importance of sectors like *Dairy Farming* for a regional economy such as Waikato can be derived. The household income created within this sector links forwards in to sectors such as *Supermarkets & Groceries*, *Other Personal Household Services*, *Sport & Recreation* etc. The inputs required for production by *Dairy Farming* link backwards in to supplying sectors such as *Electricity Generation*, *Agricultural Services*, *Non-Residential Building*, *Machinery Manufacturing*, *Road Transport* etc. The total flow-on linkages (backwards and forwards) can be estimated from the model and in the case of *Dairy Farming* constitute about 30% of the Waikato Regional Council economy in terms of GRP for the December 2015 year.

Qualifications

It should be noted the results are based on production forecasts provided by Zespri. Further, although full modelling has been undertaken for BOP the Northland results are estimated based on the assumption that kiwifruit production impacts Northland in a similar way to which it impacts BOP. Results should be considered as indicative.

Estimates of Current Contribution

The results are presented in the following sub-sections. We report:

- The current economic contribution of the kiwifruit industry to the BOP region.
- The current employment contribution of the kiwifruit industry to BOP region.
- The current economic contribution of the kiwifruit industry to the Northland region.
- The current employment contribution of the kiwifruit industry to Northland region.
- The current Māori investment and benefit from the BOP kiwifruit industry.
- The current economic contribution of the kiwifruit industry to the New Zealand economy.

Current economic contribution of kiwifruit industry to BOP region

Over the 2015/16 season, Zespri paid out a total of \$938.8m to growers in the BOP region. This is the so-called direct or first round economic impact associated with the growing of Kiwifruit in the BOP. Kiwifruit growing engenders linkages into other parts of the regional economy generating further economic impacts for the region. First we have the so-called backward linkages. These comprise sectors that supply inputs into the growing of Kiwifruit. Sectors such as *Agricultural Services, Construction Services, Fertiliser & Pesticides* supply the infrastructure required to support vines and grow the fruit. Other sectors such as Road Transport are necessary to deliver fruit to the packing houses and cool-stores. Finally, there are the business services such as *Banking & Financial Services, Auxiliary Finance & Insurance Services, Non-Residential Property Operation, Employment & Other Administrative Services, Repair & Maintenance* and similar services required by all business units in the region. The foregoing constitute the Industrial linkages associated with kiwifruit growing. The wages and salaries received by orchard employees and workers in the supplying sectors fund household expenditures in the normal of course of living and such expenditures comprise the Consumption linkages that impact the regional economy. The total of the Industrial and Consumption linkages comprises the backward linkage impacts or flow-ons. The backward linkages associated with revenue, household income and GDP as estimated by the BOP regional economic model are outlined below in Table 2.

Table 2: Backward linkages (revenue, household income and GDP) attributable to Kiwifruit production in BOP region 2015/2016

Source of Impact	Revenue \$ millions	Net Household Income \$ m	Value Added or GDP \$ millions
Direct Impact from Kiwifruit Growing	938.8	168.2	356.3
Flow-ons from industrial & retail sectors	870.0	173.4	431.4
TOTAL IMPACTS FOR THE BOP REGION	1,808.8	341.7	787.7
<i>Kiwifruit Backward Multipliers</i>	<i>1.93</i>	<i>2.03</i>	<i>2.21</i>
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	588.8	122.8	276.2
Flow-ons from Household Expenditure	281.2	50.7	155.2
TOTAL IMPACTS FOR THE BOP REGION	870.0	173.5	431.4

Table 2 summarises concisely the backward linked economic impacts from growing kiwifruit in the BOP region associated with revenue, household income and GDP. For the Revenue impact we note that Zespri paid out a total of \$938.8m to BOP growers in the 2015/2016 season. This is the first value in Table 2 above. This so-called direct impact, which is a first round impact to actual growers, induces further sales in the BOP region. First, there will be sales of inputs from supplying sectors to the Kiwifruit sector by sectors such as *Construction Services* and *Road Transport*. Secondly, the wages and salaries paid to orchard workers and to workers in supplying sectors such as *Road Transport* and similar supplying sectors, will fund household expenditures in the BOP region in the normal course of living for all types of employees. Note that Industrial flow-ons are roughly about twice as large as the flow-ons from household expenditure or Consumption flow-ons. This reflects the fact that kiwifruit growing does require a lot of supplying infrastructure in the orchard growing region. Some of these sectors are identified in Table 3 below.

The multipliers shown in Table 2 are a concise method for summarising the economic impacts from the activity under analysis. In this case growing and supplying Kiwifruit to NZ households and for export overseas. Every dollar paid to a kiwifruit grower in the BOP engenders another \$0.93 of expenditure elsewhere in the BOP region (multiplier of 1.93).

Table 3: Most important backward linked sectors to Kiwifruit production in 2015/2016

SALES REVENUE			EMPLOYMENT		
Inputs from supplying sectors			Persons employed in supplying sectors		
#	Sector	\$ mill	#	Sector	FTEs
1	Agricultural Services	106.87	1	Agricultural Services	769.86
2	Owner-Occupied Housing	54.42	2	Bldg & Pest Control Services	371.57
3	Non-Residential Pty Ops	47.88	3	Employment & Admin Services	190.64
4	Bldg & Pest Control Serv	37.15	4	Road Transport	179.71
5	Road Transport	32.83	5	Food & Beverage Retailing	172.43
6	Fertiliser & Pesticide Man	32.36	6	Construction Services	149.36
7	Bank & Financial Services	28.40	7	Repair & Maintenance Serv	148.14
8	Polymer & Rubber Prod	24.36	8	Legal & Accounting Services	145.71
9	Residential Pty Ops	24.02	9	Residential Care & Social Serv	132.36
10	Construction Services	21.20	10	Supermarkets & Grocery Retail	116.57
Top 10 supplying sectors		409.49	Top 10 supplying sectors		2376.36
Remaining 96 sectors		460.51	Remaining 96 sectors		2259.79
Total Revenue Flow-ons		870.00	Total Employment Flow-ons		4636.14

Ppty = Property Ops = Operations Bldg = Building Serv = Services Man = Manufacturing Prod = Products Admin = Administration

Table 3 shows the major sectors related to Kiwifruit growing in the BOP for the Revenue and Employment economic impacts. Both impacts serve to identify those sectors most closely related to the activity of producing kiwifruit. These sectors are closely related to the Income and Value Added impacts listed above in Table 2. Table 3 shows *Agricultural Services* to be the most closely related supplying sector to the growing of Kiwifruit. An estimated 770 FTE jobs in this BOP sector can be attributed to Kiwifruit production. Note that the sector *Building & Pest Control & Support Services* includes packing and cool-store services, which is an important service related to the production of Kiwifruit for sale to consumers.

The second related sector to kiwifruit growing is *Owner-Occupied Housing* for the Revenue impact. This sector shows the annual imputed rental that house owners would have had to pay had they not owned their own homes. This is estimated by Statistics NZ and represents an annual flow of housing services enjoyed by regional home owners. This is a legitimate cost against economic production that should be accounted for nationally and regionally. Since kiwifruit growing is almost certainly the major primary producing activity in the BOP region it is unsurprising that *Owner-Occupied Housing* is a major contributor to economic production for a major sector in the BOP (i.e. *Horticulture & Fruit Growing*).

Clearly backward linkages are a very important part of the economic impact of kiwifruit growing for the BOP region. In addition, however, the total impact of Kiwifruit growing also includes the so-called forward linkages. The economic model of the BOP region can be utilised to estimate how the product from the Kiwifruit orchards (the raw fruit) is used by other sectors to create additional products and added value for the regional economy. While the majority of kiwifruit is exported out of the region to the rest of NZ and overseas, some of the fruit is used within the BOP region creating further value from the raw fruit. Sectors related by these forward linkages comprise *Other Food Manufacturing, Supermarket & Grocery Retailing, Accommodation, Food & Beverage Retailing, Hospitals* and similar sectors. Table 3 summarises the forward linkage impacts for the BOP region.

Table 4 summarises concisely the forward linked economic impacts from growing kiwifruit in the BOP region associated with revenue, household income and GDP.

Table 4: Forward linkages (revenue, household income and GDP) attributable to Kiwifruit production in the BOP region 2015/2016

Source of Impact	Revenue \$ millions	Net Household Income \$ m	Value Added or GDP \$ millions
Direct Impact from Kiwifruit Growing	938.76	168.23	356.28
Flow-ons from forward linked sectors	160.70	26.62	79.69
TOTAL IMPACTS FOR THE BOP REGION	1,099.46	194.84	435.98
<i>Kiwifruit Forward Multipliers</i>	<i>1.17</i>	<i>1.16</i>	<i>1.22</i>
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	73.94	15.24	36.67
Flow-ons from Household Expenditure	86.76	11.38	43.02
TOTAL IMPACTS FOR THE BOP REGION	160.70	26.62	79.69

Table 4 shows the forward linked flow-ons to be much less important than the backward linked flow-ons for the supplying sectors in Table 2. Although some of the raw Kiwifruit is further processed within the region or sold by local retailers to BOP residents, the vast majority of the raw fruit is exported out of the region making for minimal forward linked impacts. The most important forward linked using sectors of the raw fruit are detailed in Table 5 for the Revenue and Employment impacts.

Table 5: Most important forward linked sectors to Kiwifruit production for 2015/2016

SALES REVENUE			EMPLOYMENT		
Revenue from using sectors			Persons employed in using sectors		
#	Sector	\$ mill	#	Sector	FTEs
1	Other Food Manufacture	17.56	1	Food & Beverage Retailing	103.21
2	Hort & Fruit Growing	9.61	2	Other Food Manufacturing	65.57
3	Dairy Manufacturing	8.25	3	Hospitals	53.43
4	Hospitals	7.80	4	Horticulture & Fruit Growing	52.21
5	Food & Beverage Retail	7.37	5	Supermarket & Grocery Retail	48.57
6	Dairy Cattle Farming	7.09	6	Accommodation	46.14
7	Agricultural Services	6.33	7	Construction Services	46.14
8	Accommodation	4.83	8	Agricultural Services	36.43
9	Construction Services	4.52	9	Primary & Secondary Schools	31.57
10	S'mkt & Grocery Retail	3.81	10	Residential Care & Social Serv	31.57
Top 10 using sectors		77.16	Top 10 using sectors		514.86
Remaining 96 sectors		83.54	Remaining 96 sectors		455.36
Total Revenue Flow-ons		160.70	Total Employment Flow-ons		970.21

Hort = Horticulture S'mkt = Supermarket Serv = Services

The sectors listed as most important for forward linkages to Kiwifruit growing require some explanation. Kiwifruit growing is part of the sector *Horticulture & Fruit Growing*. As well as Kiwifruit, other fruit growing is included in this sector, for example citrus and pipfruit. Furthermore, other crop growing such as vegetables is included as well as animal feed crops. This explains the forward linkages to *Dairy Farming* and *Dairy Manufacturing*. Accordingly, Kiwifruit growing is not a major input into *Dairy Farming* (and resulting milk solids processing) but other activities included in this sector are important for dairy farming and the processing of milk solids. Most of the remaining sectors listed in Table 5 show an obvious connection to production of the raw kiwifruit apart from *Construction Services*. More detailed analysis would be required to uncover the links to this sector.

Estimates of the percentage impact for the BOP economy from the growing of kiwifruit range from 5.8% to 7.6% depending on the impact measure used. The Revenue multiplier at 2.1 states that every dollar of Kiwifruit produced generates another \$1.10 of sales revenue in the BOP economy. This revenue could be realised in sectors such as *Agricultural Services* (backward linked) or *Supermarket & Grocery Retailing* (forward linked). The other multipliers can be

similarly interpreted and show production of Kiwifruit to be an important activity for the BOP regional economy.

As noted previously, the backward linked flow-ons (inputs into Kiwifruit growing) are much more important than the forward linked flow-ons in terms of value. If for any reason all kiwifruit growing ceased in the BOP region, the backward linked flow-ons as well as the direct impacts would be lost to the regional economy. As summarised in Table 2, these losses would be considerable for the BOP economy. The forward linked flow-ons would not necessarily be lost as raw Kiwifruit could be imported from other regions in NZ and utilised in the BOP sectors affected. Clearly, there would be some loss to the BOP economy as the current using sectors would have to pay higher costs (e.g. transport) than they do with home region suppliers of the fruit.

Current employment contribution of kiwifruit industry to BOP region

The kiwifruit industry in the BOP directly employs more than five thousand people (5,156 FTE). This is complemented by an additional flow-on employment of 5,606 FTE. Backward linkages account for 4,636 FTE and forward linkages account for 970 FTE. For the backwards linkages the largest contribution is flow-ons from industrial sectors of 3,194 FTE which is complemented by 1,443 FTE from household expenditure. For the forward linkages the contribution is 970 FTE with flow-ons of 418 FTE from industrial sectors and 552 FTE from household expenditure.

Table 6: Linkages (employment) attributable to kiwifruit production in BOP region 2015/2016

Source of Impact	Backward linkages Employment (FTEs)	Forward linkages Employment FTEs	Total Employment FTE
Direct Impact from Kiwifruit Growing	5,156	5,156	5,156
Flow-ons from industrial & retail sectors	4,636	970	5,606
TOTAL IMPACTS FOR THE BOP REGION	9,792	6,126	10,762
<i>Kiwifruit Backward Multipliers</i>	<i>1.89</i>	<i>1.19</i>	
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	3,194	418	3,611
Flow-ons from Household Expenditure	1,443	552	1,995
TOTAL Flow-on IMPACTS FOR THE BOP REGION	4,636	970	5,606

Current economic contribution of kiwifruit industry to Northland region

The kiwifruit industry currently directly contributes over \$30m of revenue to the Northland economy each year (\$33.13). There are direct flow-on effects of \$30.71m of which \$20.78m comes from industrial sectors and \$9.92m from household expenditures. The household and GDP effects are also recorded in Table 7. Forward linkages are also important even though they are not as large as backward linkages. Direct forward flow-ons account for \$5.67m of revenue. \$2.61m comes from industrial sectors and \$3.06m from household expenditures. The household and GDP effects are also recorded in Table 8.

Table 7: Backward linkages (revenue, household income and GDP) attributable to Kiwifruit production in Northland region 2015/2016 (\$ millions)

Source of Impact	Revenue	Net Household Income	Value Added or GDP
Direct Impact from Kiwifruit Growing	33.13	5.94	12.57
Flow-ons from industrial & retail sectors	30.71	6.12	15.23
TOTAL IMPACTS FOR THE NORTHLAND REGION	63.84	12.06	27.80
<i>Kiwifruit Backward Multipliers</i>	<i>1.93</i>	<i>2.03</i>	<i>2.21</i>
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	20.78	4.33	9.75
Flow-ons from Household Expenditure	9.92	1.79	5.48
TOTAL IMPACTS FOR THE NORTHLAND REGION	30.71	6.12	15.23

Table 8: Forward linkages (revenue, household income and GDP) attributable to Kiwifruit production in the Northland region 2015/2016 (\$ millions)

Source of Impact	Revenue	Net Household Income	Value Added or GDP
Direct Impact from Kiwifruit Growing	33.13	5.94	12.57
Flow-ons from forward linked sectors	5.67	0.94	2.81
TOTAL IMPACTS FOR THE NORTHLAND REGION	38.80	6.88	15.39
<i>Kiwifruit Forward Multipliers</i>	<i>1.17</i>	<i>1.16</i>	<i>1.22</i>
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	2.61	0.54	1.29
Flow-ons from Household Expenditure	3.06	0.40	1.52
TOTAL IMPACTS FOR THE NORTHLAND REGION	5.67	0.94	2.81

Current contribution of kiwifruit industry to employment in Northland region

The kiwifruit industry in the Northland directly employs 182 FTE. This is complemented by an additional flow-on employment of 198 FTE. Backward linkages account for 164 FTE and forward linkages account for 34 FTE. For the backward linkages the largest contribution is flow-ons from industrial sectors of 113 FTE which is complemented by 51 FTE from household expenditure. For the forward linkages the contribution is smaller with flow-ons of 15 FTE from industrial sectors and 20 FTE from household expenditure.

Table 9: Linkages (employment) attributable to kiwifruit production in the Northland region 2015/2016

Source of Impact	Backward linkages Employment (FTEs)	Forward linkages Employment FTEs	Total Employment FTE
Direct Impact from Kiwifruit Growing	182	182	182
Flow-ons from industrial & retail sectors	164	34	198
TOTAL IMPACTS FOR THE NORTHLAND REGION	346	216	380
<i>Kiwifruit Backward Multipliers</i>	<i>1.89</i>	<i>1.19</i>	
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	113	15	127
Flow-ons from Household Expenditure	51	20	70
TOTAL Flow-on IMPACTS FOR THE NORTHLAND REGION	164	34	198

Current contribution of kiwifruit industry to BOP Māori

In 2015/16 the kiwifruit industry made important contributions to BOP Māori. There was an impact of \$118.16m and an associated impact on Māori households of \$22.1m and value added to the regional GDP of 52.04m of which one would expect Māori to capture approximately one quarter.

Table 10: Total economic impacts for Māori from Kiwifruit production in the BOP region 2015/2016

Source of Impact	Impact \$ millions	Net Household Income \$ m	Value Added or GDP \$ millions
Direct Impact from Kiwifruit Growing	56.72	10.16	21.34
Backward Linked Flow-ons (Table 1)	52.00	10.38	26.02
Forward Linked Flow-ons (Table 3)	9.45	1.54	4.69
TOTAL IMPACTS FOR BOP Māori	118.16	22.10	52.04
<i>Kiwifruit Multipliers</i>	<i>2.10</i>	<i>2.19</i>	<i>2.43</i>

Table 11: Linkages (Māori employment) attributable to kiwifruit production in BOP region 2015/2016

Source of Impact	Backward linkages Employment (FTEs)	Forward linkages Employment FTEs	Total Employment FTE
Direct Impact from Kiwifruit Growing	1,188	1,188	1,188
Flow-ons from industrial & retail sectors	1,064	222	1,287
TOTAL IMPACTS FOR THE BOP REGION	2,253	1,411	2,475
<i>Kiwifruit Backward Multipliers</i>	<i>1.89</i>	<i>1.19</i>	
FLOW-ONS FROM RELATED SECTORS			
Flow-ons from Industrial Sectors	735	96	831
Flow-ons from Household Expenditure	329	126	457
TOTAL Flow-on IMPACTS FOR THE BOP REGION	1,064	222	1,287

It should be noted that this benefit to Māori is built on significant investment by Māori participating in the industry. Māori growers have invested with more than 600 ha of kiwifruit in production in the BOP. Nationwide approximately 6% of both green and gold kiwifruit is produced by Māori owned business entities. Approximately 96% of this is produced in the BOP. There may well be more Māori entities producing kiwifruit that have not yet been identified.

This suggests that Māori entities currently have a capital investment of at least \$300m in BOP kiwifruit production.

Current contribution of kiwifruit industry to New Zealand

Kiwifruit is the largest horticulture export industry in New Zealand with its success derived from the investment of orchardists, packhouses, Zespri, collaborative marketers and other stakeholders. The backward linked flow-ons (inputs into kiwifruit growing) are much more important than the forward linked flow-ons in terms of value. If for any reason all kiwifruit growing ceased in NZ, the backward linked flow-ons as well as the direct impacts would be lost to the economy. The forward linked flow-ons would not necessarily be lost as raw kiwifruit could be imported from other regions in NZ and utilised in the sectors affected.

The total impact for Kiwifruit production for BOP region for the year 2015/2016 is estimated to be:

- Revenue: \$4.5b
- Net household income: \$901m
- GDP: \$ 2.06b

Nationwide, Zespri payments to grower for the 2015/2016 season totalled \$1,143m. This includes the \$938.8 m to the BOP growers (82%). Aggregate impacts from this production revenue are detailed in Table 10. These impacts were derived using a 106-sector economic model of the NZ economy for the year ended December 2015.

Table 12: Economic Impacts for Kiwifruit Production in New Zealand for 2015/2016 (Excluding Zespri Expenses)

Source of Impact	Revenue \$ millions	Net Household Income \$ m	Employment FTEs	Value Added or GDP \$ millions
Direct Impact from Kiwifruit Growing	1,143.05	204.84	7,393	433.82
Backward Linked Flow-ons	1,817.30	346.13	8,145	875.94
Forward Linked Flow-ons	1,558.74	349.76	7,827	751.31
TOTAL IMPACTS FOR NZ	4,519.09	900.73	23,365	2061.07
<i>Kiwifruit Multipliers</i>	<i>3.95</i>	<i>4.40</i>	<i>3.16</i>	<i>4.75</i>
NZ AGGREGATES FOR Y/E DECEMBER 2015	317,630.1	95,316.7	2,046,275	245,920.0
<i>Percentage Impacts for Kiwifruit Growing</i>	<i>1.4%</i>	<i>0.9%</i>	<i>1.1%</i>	<i>0.8%</i>

No detail is listed for the major backward and forward linked sectors for NZ-wide production, but the major linked sectors would be very similar to those listed in Tables 2 and 4 for the BOP region. One major difference is the magnitude of the forward linkages for the NZ economy for kiwifruit production. The NZ economy is much larger than the BOP regional economy and there

is more scope NZ-wide for utilising forward linkages in sectors such as Other Food Manufacturing, Supermarket & Grocery Retailing, Food & Beverage Services and similar sectors. Consequently, the resulting NZ multipliers are much higher than the BOP counterparts.

Estimates of Future Contribution

Future production and economic impacts is based on NZ production and yields provided by Zespri through to the period 2020/21 (new_cultivar_impact.xlsx) dated 30 September 2016. These numbers have been extended through to the 2029/30 season. The annual growth rate in production across the 14 years averages 5.4% per annum for the entire crop but for individual varieties the average growth rate ranges from 1.7% per annum to 11.7% per annum. Prices used in the study are based on 2015/16 prices and there is no adjustment for inflation. Future analysis could stimulate production and prices with a range of values. During this period the total NZ crop grows from 120m trays to 253m trays.

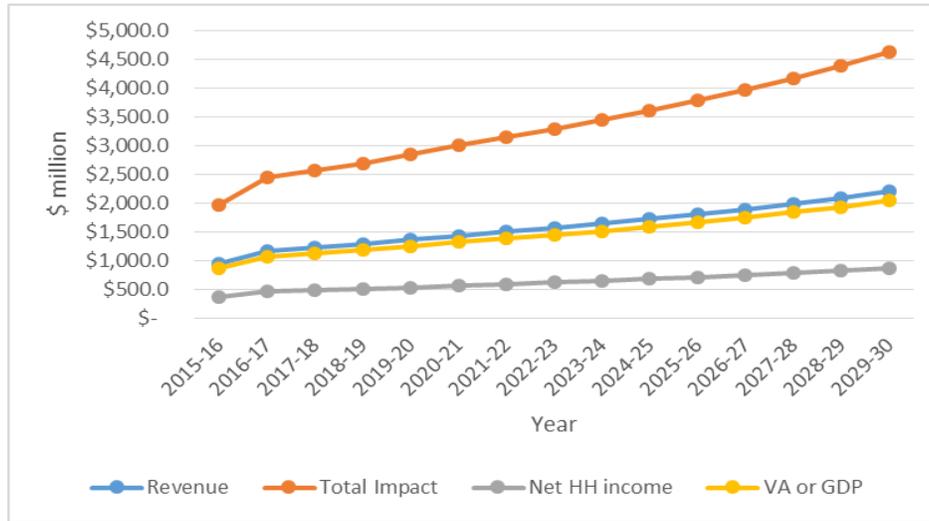
The results are presented in the following sub-sections. We report:

- The future economic contribution of the kiwifruit industry to the BOP and Northland regions.
- The future employment contribution of the kiwifruit industry to BOP and Northland regions.
- The future Māori investment and benefit from the BOP kiwifruit industry.
- The future economic contribution of the kiwifruit industry to the New Zealand economy

Future economic contribution of kiwifruit industry to BOP region

The production of new varieties of kiwifruit is likely to expand the industry and its economic impact. Over the fourteen years from 2015/16 to 2029/30 BOP kiwifruit total revenue is predicted to grow from just under \$2 billion to approaching \$5 billion (see Figure 1). The contribution to regional GDP is expected to grow from under \$1 billion to just over \$2 billion. Net household income is also expected to increase significantly. Over the 14 years this is the equivalent of revenue growing by \$190m per year, household income growing by \$36m per year and GDP growing by \$84m per year. The details can be seen in Table 13.

Figure 1: Economic Contribution of BOP Kiwifruit through Time



Future economic contribution of kiwifruit industry to Northland region

The production of new varieties of kiwifruit is also likely to expand the Northland industry and its economic impact. Over the fourteen years from 2015/16 to 2029/30 Northland kiwifruit revenues are predicted to grow from \$70m to more than \$160m (see Figure 2). The contribution to regional GDP is expected to grow from just over \$30m to more than \$70m. Net household income is also expected to increase significantly. Over the 14 years this is the equivalent of revenue growing by \$6.7m per year, household income growing by \$1.3m per year and GDP growing by \$3m per year. The details can be seen in Table 14.

Figure 2: Economic Contribution of Northland Kiwifruit through Time

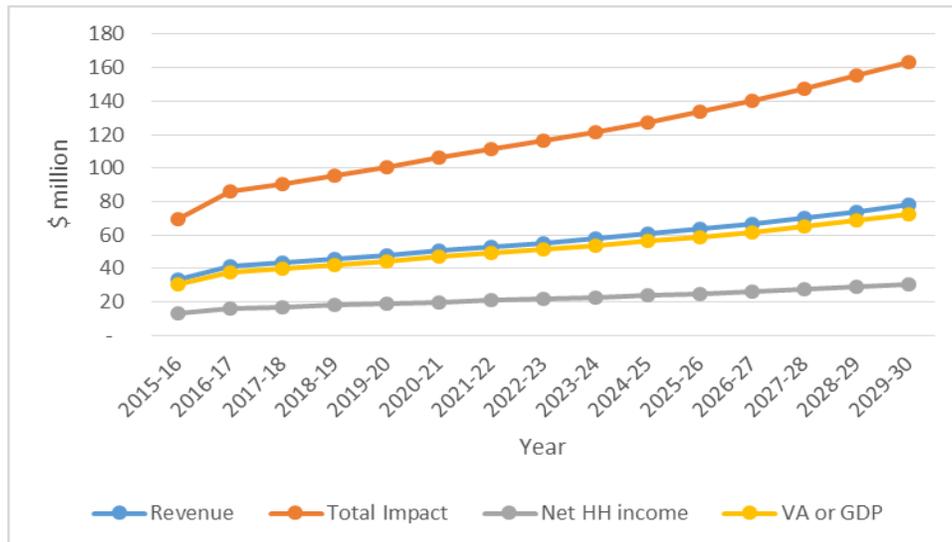


Table 13: BOP Economic Impact through Time (\$ million)

Source of Impact	2015/2016			2029/30			Average annual increase in value		
	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP
Direct Impact from Kiwifruit Growing	938.8	168.2	356.3	2,208.7	395.8	838.3	90.7	16.3	34.4
Backward Linked Flow-ons	870.0	173.4	431.4	2,046.9	407.9	1,015.1	84.1	16.8	41.7
Forward Linked Flow-ons	160.7	26.6	79.7	378.1	62.6	187.5	15.5	2.6	7.7
TOTAL IMPACTS FOR THE BOP REGION	1,969.5	368.3	867.4	4,633.6	866.3	2,040.8	190.3	35.6	83.8

Table 14: Northland Economic Impact through Time (\$ million)

Source of Impact	2015/2016			2029/30			Average annual increase in value		
	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP
Direct Impact from Kiwifruit Growing	33.1	5.9	12.6	78.0	14.0	29.6	3.2	0.6	1.2
Backward Linked Flow-ons	30.7	6.1	15.2	72.2	14.4	35.8	3.0	0.6	1.5
Forward Linked Flow-ons	5.7	0.9	2.8	13.3	2.2	6.6	0.5	0.1	0.3
TOTAL IMPACTS FOR THE NORTHLAND REGION	69.5	13.0	30.6	163.5	30.6	72.0	6.7	1.3	3.0

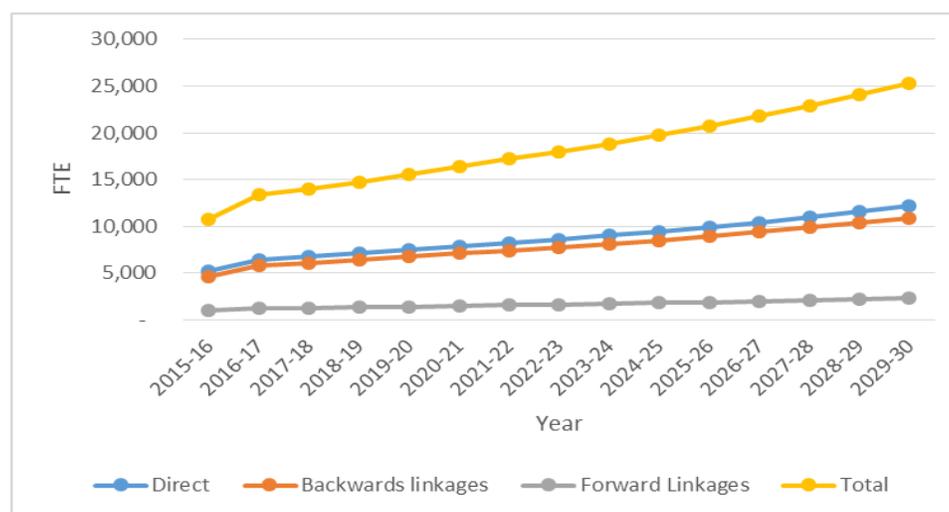
Future employment contribution of kiwifruit industry to the BOP region

The employment contribution of the kiwifruit industry in the BOP is expected to grow from 10,762 FTE in 2015/2016 to more than 25,000 FTE in 2029/30 (see Figure 3). This is the equivalent in employment growth of more than 1,000 FTE each year approximately 49% coming from direct employment from kiwifruit growing, 44% from backwards linkages and 8% from forward linkages.

Table 15: BOP Employment Impact through Time

Source of Impact	2015/2016	2029/30	Average annual increase in FTE
Direct Impact from Kiwifruit Growing	5,156	12,131	498
Backward Linked Flow-ons	4,636	10,908	448
Forward Linked Flow-ons	970	2,052	78
TOTAL IMPACTS FOR THE BOP REGION	10,762	25,091	1,024

Figure 3: BOP Kiwifruit Employment Growth through Time



Future contribution of kiwifruit industry to employment in Northland region

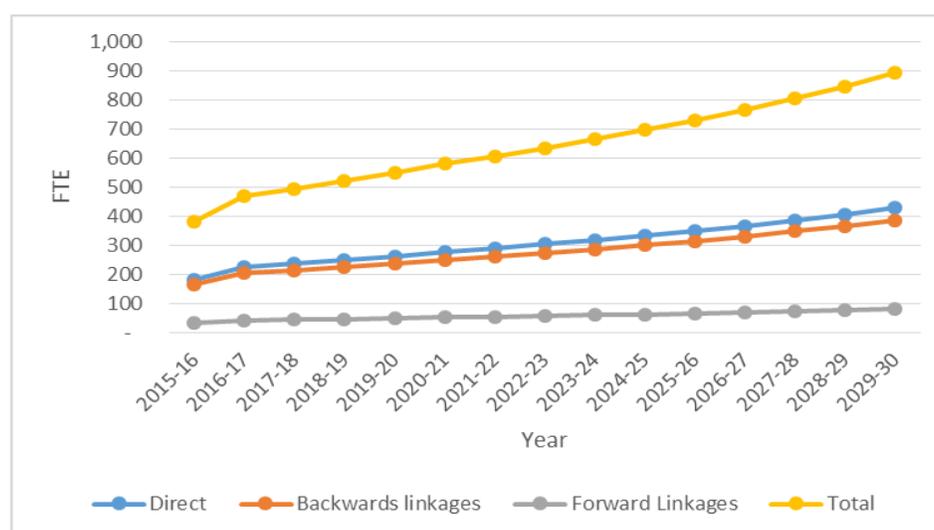
The employment contribution of the kiwifruit industry in the Northland region is expected to grow from 380 FTE in 2015/2016 to nearly 900 FTE in 2029/30 (see Figure 4). This is the

equivalent in employment growth of 37 FTE each year approximately 18 coming from direct employment from kiwifruit growing, 16 from backwards linkages and 3 from forward linkages.

Table 16: Northland Employment Impact through Time

Source of Impact	2015/2016	2029/30	Average annual increase in FTE
Direct Impact from Kiwifruit Growing	182	428	18
Backward Linked Flow-ons	164	385	16
Forward Linked Flow-ons	34	72	3
TOTAL IMPACTS FOR THE NORTHLAND REGION	380	886	37

Figure 4: Employment Contribution of Northland Kiwifruit through Time



Future economic contribution of kiwifruit industry to BOP Māori

The production of new varieties of kiwifruit is likely to expand Māori investment in the industry and its economic impact. If we assume Māori investment occur at the same rate as other investors over the fourteen years from 2015/16 to 2029/30 BOP Māori kiwifruit total revenues are predicted to grow from just \$118m to \$278m per year (see Figure 5). The contribution to

regional GDP is expected to grow from \$52m to just over \$120m. Net household income is also expected to increase significantly. Over the 14 years this is the equivalent of revenue growing by \$11.4m per year, household income growing by \$2.1m per year and GDP growing by \$5m per year. The details can be seen in Table 17.

Likewise Māori employment in the in the BOP kiwifruit industry is likely to increase by FTE per year (see Figure 6).

Figure 5: BOP Māori Economic Impact through Time

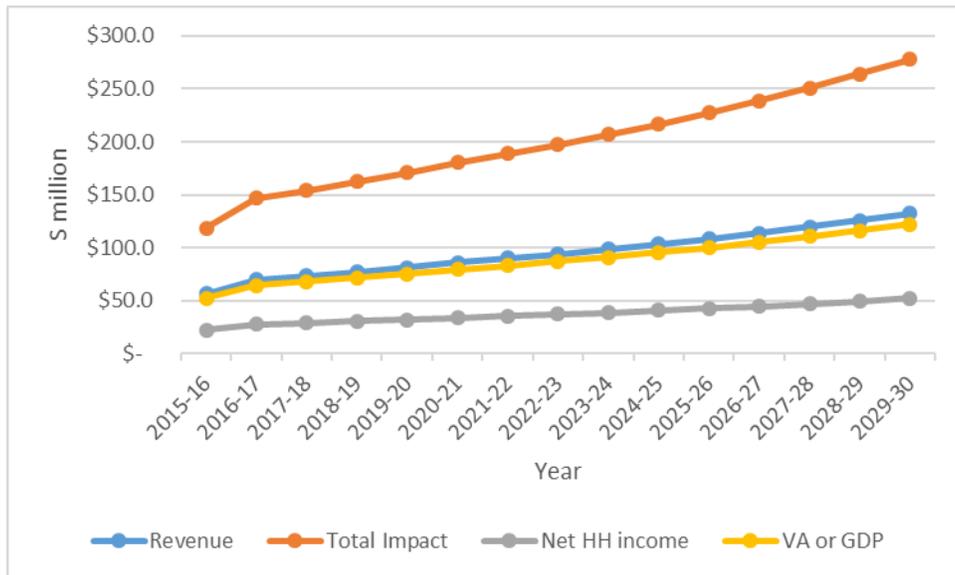
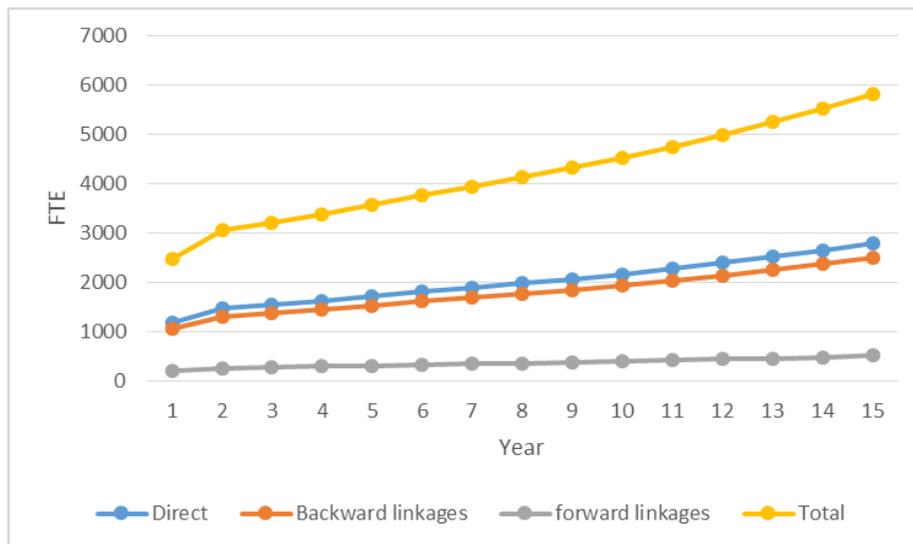


Figure 6: BOP Māori Employment Impact



Future contribution of kiwifruit industry to New Zealand

The production of new varieties of kiwifruit is likely to expand the industry and its economic impact. Over the fourteen years from 2015/16 to 2029/30 New Zealand kiwifruit revenues are predicted to grow from \$5.5b to approaching \$13b. The contribution to GDP is expected to grow from \$2.6b to just over \$6b. Net household income is also expected to increase significantly. Over the 14 years this is the equivalent of revenue growing by \$531m per year, household income growing by \$110m per year and GDP growing by \$252m per year. The details can be seen in Table 18.

Growth in kiwifruit production will generate a growth in total economic impact and in Net household income and regional GDP.

Table 17: BOP Māori Economic Impact through Time (\$ million)

Source of Impact	2015/2016			2029/30			Average annual increase in value		
	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP
Direct Impact from Kiwifruit Growing	56.3	10.1	21.4	132.5	23.7	50.3	5.4	1.0	2.1
Backward Linked Flow-ons	52.2	10.4	25.9	122.8	24.5	60.9	5.0	1.0	2.5
Forward Linked Flow-ons	9.6	1.6	4.8	22.7	3.8	11.3	0.9	0.2	0.5
TOTAL IMPACTS FOR BOP Māori	118.2	22.1	52.0	278.0	52.0	122.4	11.4	2.1	5.0

Table 18: New Zealand Economic Impact through Time (\$ million)

Source of Impact	2015/2016			2029/30			Average annual increase in value		
	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP	Revenue	Net Household Income	Value Added or GDP
Kiwifruit Growing & production	4,519.1	900.7	2,061.7	10,632.2	2,119.0	4,850.7	436.7	87.0	199.2
Zespri International activity in NZ	982.8	233.2	547.3	2,312.2	548.7	1,287.6	95.0	22.5	52.9
TOTAL IMPACTS FOR NEW ZEALAND	5,501.9	1,133.9	2,608.3	12,944.4	2,667.7	6,136.8	531.6	109.6	252.0

Current and future contribution of kiwifruit industry by cultivar

New varieties have proven critical to the economic viability of the industry and its ongoing contributions to the economy. For instance if Gold 3 had not been available and rolled out following PSA and there had been no replacement available it is estimated the industry in 2030 would have been approximately 46% of our projections for 2030. Industry profits would be even lower given the proportion of industry fixed costs having to be spread over a small volume of production, and as a result gold growers would have had fewer opportunities to recover their accumulated debts associated with PSA. The availability of Gold 3 led to less exits from the industry, fewer personal, community and social crises. Gold 3 provided a platform for sustained regional employment. Further, in the absence of a productive gold cultivar there would have been the temptation for growers to over produce green kiwifruit and stricter crop management protocols would have been required.

This can be seen in that cultivars generated in the First Partnership (Gold 3) are expected to create 8,328 new jobs and \$1,291m in the rural industry by 2030, and \$310m for regional Iwi on an annual basis. This is complemented by the enhanced employment capability of rural New Zealanders and Māori and the development of management expertise and capital base which positively contributes to other sectors. In addition it is appropriate to note the positive effects throughout the wider economy.

Table 19: Current and Future Economic Contribution by Cultivar (\$ million)

2015/2016	Total	Green	Gold3	Other
NZ Production Revenue (\$ million)	4,516	2,710	1,535	271
NZ Production Revenue (%)	100%	60%	34%	6%
NZ Employment (FTE)	23,365	14,019	7,944	1,402
BOP GDP (\$ million)	867	520	295	52
Northland GDP (\$ million)	30.60	18.36	10.40	1.84
Māori Revenue (\$ million)	271	163	92	16
2029/2030	Total	Green	Gold3	Other
NZ Production Revenue (\$ million)	10,632	3,296	6,698	638
NZ Production Revenue (%)	100%	31%	63%	6%
NZ Employment (FTE)	54,440	16,876	34,297	3,266
BOP GDP (\$ million)	2,041	633	1,286	122
Northland GDP (\$ million)	72	22	45	4
Māori Revenue (\$ million)	638	198	402	38

Other Considerations

The analysis performed in a preliminary undertaking. It builds on many assumptions that can be refined on the basis of further information. It is recommended that further research be undertaken to include: further consideration of alternative scenarios of cultivar development; regional models for all regions; refined production forecasts; and refined price forecasts. Further consideration should be given to what is happening in other sectors as they can have large impact over time periods larger than a decade. The analysis of Māori investment and returns would benefit from further work to more accurately estimate investment and cash flows. Finally, it is important to check all data against other sources to ensure reliability and consistency.

It should also be noted that this analysis has not taken account of capital expenditure impacts. Given an expanding industry this will lead to further capital investments which will be additional to those benefits which have been estimated.

Conclusions

Production associated with the introduction of new kiwifruit varieties is likely to expand economic benefits to regional New Zealand and the country as a whole. The employment contribution to the nation is expected to be an additional 29,000 FTE by 2029/30. The GDP contribution is expected to be an additional \$3.5b per annum by 2029/30. The benefits are largest in the BOP but are also important in other regions such as Northland. They are very important for Māori given that they facilitate employment within tribal areas and enable tribal members to derive income and employment in their “home places”. This suggests kiwifruit will continue to be the largest horticultural export industry in 2030. However, nothing should be taken for granted. Disease and pests can damage the industry very quickly. Offshore kiwifruit producers have the potential to enhance their product mix and value chain efficiency. Despite the qualifications this analysis suggests the successful introduction and expansion of new kiwifruit varieties has the potential to significantly enrich the regional economics of kiwifruit growing regions and the nation as a whole.

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