Net protein contribution (NPC) estimation for Australian pig farms

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Executive Summary

Livestock are often criticised for competing with people for food, particularly where they are fed grain and other ingredients that humans could eat. Net protein contribution (NPC) tests this directly. It compares the human-edible protein an animal produces with the human-edible protein it is fed, and adjusts for the difference in protein quality between the two. A value above 1.0 means the system returns more human-edible protein than it uses; a value below 1.0 means it competes with human nutrition. Until recently this measure had rarely been applied outside Europe, and never to a group of Australian pig farms. This project set out to quantify the NPC for pig farms across Australia.

The NPC of seven Australian pig production systems, ranging from 544 to 4,559 breeders was calculated. Australian Pork Limited collected feed formulations, feed volumes and slaughter data from each farm and supplied them anonymously. The method of van Barneveld et al. (2023) was followed: net protein contribution (NPC) determined by multiplying the human-edible protein conversion efficiency (HePCE) by the gain in protein quality (PQR), with quality measured by the Digestible Indispensable Amino Acid Score (DIAAS).

Every one of the seven systems was a net contributor to human protein supply, with NPC values from 1.52 to 5.63 and a pooled value of 3.30. This sits close to the 3.26 already published for a single Australian supply chain (van Barneveld et al., 2023), which confirms the size of the effect. The result is driven by protein quality rather than feed efficiency: each system was fed more human-edible protein than it produced, but the pig converts that low-quality feed protein (DIAAS 16.9 to 39.4) into excellent-quality pork (DIAAS 113.9), and the resulting quality upgrade lifts every system above 1.0.

The main reason Australian pork scores so much higher than European pork (0.50 to 1.23) is raw material availability. Australian diets use processed animal proteins such as meat meal, along with feed-grade and downgraded grain and other by-products, that people do not eat. To test how much this depends on assumptions, we recalculated all seven systems using human-edible values from the United Kingdom, Austria and France. Every system remained a net contributor under all of them (pooled values of 1.81, 2.68 and 2.49). Australian pork also compares well with poultry and intensive ruminant systems, though it remains below ruminants fed mainly from land that grows no human food.

For the Australian pork industry, this provides a credible, evidence-based response to the feed-versus-food criticism and a sustainability measure to sit alongside carbon and land-use figures. As the net protein contribution depends on continued access to human-inedible feedstuffs, protecting that access is both a sustainability and a commercial priority.

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1. Background to Research

Sustainability refers to a moral, ideally habitual, way of acting in which a person or group intends to avoid deleterious effects on the environmental, social and economic domains, consistent with a harmonious relationship conducive to a flourishing life (Bañón Gomis et al., 2011). A livestock production system is considered sustainable if it is acceptable now and its expected future effects are acceptable, particularly regarding resource use and availability, the consequences of the system functioning, and the morality of actions within it.

Strategies to increase sustainability in livestock production generally fall into three categories (Schader *et al.*, 2015): *efficiency* (productivity gains that meet demand while curbing environmental impacts); *sufficiency* (reduced demand for animal products); and *consistency* (reduced use of food-competing, human-edible components in rations). The *consistency strategy* shifts livestock's role from a source of high-quality protein to one of utilising resources unsuited to human food production: *grasslands*, which cover roughly two-thirds of global agricultural area and suit ruminants rather than crops; and *food waste and by-products* such as brans, whey and oilseed meals. The rationale is that environmental pressure could be reduced by favouring grassland-based ruminant production and cutting human-edible feedstuffs from both ruminant and monogastric diets.

Despite concerted efforts, undernourishment has plateaued at roughly eight per cent, with approximately 670 million people lacking an adequate diet (FAO, 2025). A key food-security concern is human-edible food in livestock diets: livestock consume an estimated one-third of global grain production (Mottet *et al.*, 2017), cereal feed use is projected to grow 1.4 per cent annually (CAST, 1999), and almost two-thirds of the protein fed to pigs and poultry in Northern Europe is human-edible (Wilkinson, 2011).

Diverting these feedstuffs straight to human consumption seems an obvious fix, but proteins are not interchangeable; differing in nutritional profile, digestibility, bioavailability, environmental cost and consumer acceptance. Unlike most plant proteins, animal proteins are high quality and provide a complete set of essential amino acids (Ertl *et al.*, 2016a), and the social drivers of meat consumption—pleasure, luxury, status—are powerful and hard to shift (Wyngaarden *et al.*, 2020).

Although a shift toward plant-based protein has been recommended (Willett *et al.*, 2019; Lonnie and Johnstone, 2020), the quality of alternatives matters. Protein quality is defined largely by indispensable amino acid (IAA) content, which the body cannot synthesise and must obtain from diet (Herreman et al., 2020). The Digestible Indispensable Amino Acid Score (DIAAS) is the recommended standard (FAO, 2011): <75 (no claim), 75–99 (high quality), ≥100 (excellent). Most cereals, legumes and forages warrant no claim, soybeans are high quality, and potato and animal proteins are excellent. This capacity to upgrade low-quality protein lets animals act as a "battery of nutrients," recovering nutrients otherwise lost to the food system (Wyngaarden *et al.*, 2020).

Efficiency is classically measured by feed conversion ratio (FCR). Monogastrics convert more efficiently than ruminants, and grain-fed ruminants better than forage-fed. But counting only human-edible feeds changes the picture: Galloway *et al.* (2007) reported total feed-to-meat ratios of 20:1 (ruminant) and 3.8:1 (monogastric), shifting to 3:1 and 3.4:1 when restricted to arable-land feeds. This has prompted use of *human-edible protein conversion efficiency* (HePCE) to compare food systems, refined further by accounting for protein quality to define a food's *net protein contribution* (NPC).

2. Objectives of the Research Project

This project sets out to calculate the net protein contribution of a range of Australian pig farms.

3. Introductory Technical Information

Early attempts to quantify the competition between livestock and humans for protein focused on estimating the human-edible fraction of feedstuffs. The Council for Agricultural Science and Technology (CAST 1999) produced some of the first estimates of the proportions of human-edible energy and protein in feeds but did not document the methodology underpinning them. Wilkinson (2011) built on this work, expanding the CAST proportions into broader categories and assumed that 80% of cereal grains, pulse grains and soybean meal were edible by humans, while only 20% of other oilseed meals and grain by-products were. Ertl *et al.* (2015) refined these figures by interrogating the scientific literature to support a range of scenarios for the human-edible fraction of individual raw materials, recognising that this fraction is not a single fixed value but shifts with processing, regional food standards and consumer habits. Laisse *et al.* (2016) reinforced this point through analysis of French industrial food-processing chains and concluded that estimation methods remained inconsistent between authors; a key limitation, since the assumed edible fraction strongly influences any downstream efficiency calculation and makes comparisons between studies difficult to interpret.

This body of work motivated a move beyond simple feed conversion toward measures that account for what is genuinely edible by humans, and ultimately for protein quality. Ertl *et al.* (2016b) formalised the net protein contribution (NPC), defined such that a value above 1.0 indicates a system returns more human-edible protein than it consumes, whereas a value below 1.0 indicates net competition with human nutrition. The NPC combines human-edible protein conversion efficiency with a protein-quality ratio reflecting the upgrade in amino acid value when low-quality feed protein is converted to animal protein. Therefore, to determine NPC of a livestock production system, the attributes of the protein and its quality, the efficiency of protein conversion in the animal and the contribution it makes to meeting the nutrient requirements of the consumer need to be understood.

Subsequent application has been concentrated in Europe, including the French pig-production assessments of Laisse *et al.* (2018a, 2018b). Reported NPC studies remain few, particularly outside Europe; in Australia, Thomas *et al.* (2021) provided the only published estimate prior to the work of van Barneveld *et al.* (2023), calculating NPC for rangeland and feedlot beef and reporting a very high value (1597) for fully grass-fed beef, consistent with a system fed almost no human-edible protein. This scarcity of NPC studies, and the absence of information on pork production systems in Australia, underlines the need for the present analysis.

4. Research Methodology

The NPC of Australian pork production systems were calculated using the methodology described in van Barneveld *et al.* (2023).

The first step is the calculation of the human-edible protein conversion efficiency (HePCE), the ratio of human-edible protein produced (HePp) and human-edible protein consumed (HePf).

$$HePCE = \frac{HePp}{HePf}$$

As not all proteins are created equal, in terms of amino acid composition and ratio, the second step is to consider the ratio of the quality of the protein (PQR) that is being produced (DIAASp) and the quality of the protein being fed (DIAASf). With the quality of the protein based on its composition of essential amino acids, the digestible indispensable amino acid score (DIAAS, FAO 2011).

$$PQR = \frac{DIAASp}{DIAASf}$$

The third, and final, step is the multiplication of the efficiency of human-edible protein conversion (HePCE) by the change in protein quality (PQR) that occurs when this human-edible protein is fed to animals. This is the net protein contribution (NPC) of the system being examined.

$$NPC = PQR \times HePCE$$

Although these three equations seem straightforward, there is considerable complexity and interpretation involved in determining the amount of human-edible protein and its quality.

Production system data was sourced by Australian Pork Ltd (APL) using a designed NPC Feed Capture Worksheet. The data was completely anonymised with no details about location, housing type or genetics supplied. This worksheet captured output data such as the number of progeny and breeders slaughtered and either an average carcase weight or a total annual slaughter weight to enable the calculation of HePp. It also captured input data, such as the total feed usage and the raw material inclusion rate within the diet formulations fed (Appendix 1). The worksheet was built such that individual diet formulations could be entered (up to 5 breeder and 7 progeny diets) on a monthly or annual basis, with their respective tonnages, and these would be calculated into an annual feed summary. The option to directly enter a whole of production system raw material mix was also possible, with the aim of allowing the easiest collection method possible. The number of breeders within the system was also collected as a quality step with the number sold per sow, progeny weight sold per sow and the total feed per sow assessed against industry norms.

This accumulated data was then entered into another MS Excel worksheet developed by researchers within the SunPork Group to calculate DIAAS values of the diets (DIAASf), calculate the human-edible protein fed (HePf) and then ultimately calculate the NPC for each production system.

The determination of the human-edible protein in feed is complicated by social, cultural and regional specifics. These specifics can influence the assumptions made and therefore results need to be interpreted carefully and comparison across 'global' systems made with caution. A range of human-edible proportions found in the literature have been included as separate outputs (Appendix 2).

5. Results

The self-reported information from farms recruited by APL covered farms ranging from 544 to 4,559 breeders (Table 1). Performance measures were calculated from the provided data as a simple error checking exercise, with no obvious errors observed. The number of pigs sold per sow per year were within a broadly expected range (18.8 – 26.1), carcase weights reflected different market segments (72.5 – 90.3 kg) whilst the total feed per sow per year (6.5 – 8.6 t) and herd dressed weight feed conversion (3.35 – 4.33) where within observed benchmarks.

Table 1. Self-reported farm information and calculated performance measures of seven Australian pig production systems included in this study to determine their net protein contribution.

Farm…	**A**	**B**	**C**	**D**	**E**	**F**	**G**
N. Breeders	1,282	544	1,700	4,559	2,129	2,455	2,647
Sold/sow/yr	23.6	26.1	24.5	18.8	24.9	19.6	19.3
Carcase weight, kg	73.6	77.8	75.7	87.7	90.3	72.5	82.3
Total feed/sow/yr	6,852	7,085	7,147	7,509	8,590	6,456	6,591
Herd DW FCR[1]	3.73	3.35	3.67	4.33	3.65	4.31	3.93

[1]Herd DW FCR, Herd feed conversion ratio on a dressed carcase weight basis.

The human-edible protein produced was calculated from the total mass of progeny and breeder weight sold and a standard carcase protein content (140 g/kg) and a standardised offal recovery mass from progeny sold and associated protein content (180 g/kg, Table 2). Human-edible protein fed was calculated from each of the seven production systems from estimations of provided raw material inclusion rates and tonnages fed.

The human-edible protein conversion efficiency (HePCE) ranged from 0.52 to 0.89 which suggests that more human-edible protein was being fed to pigs than what they were producing (Table 2). However, the quality of the protein contained in the raw materials fed was low (DIAASf, 16.9 to 39.4), and therefore the protein quality ratio (PQR) of the protein produced compared to that fed was high (2.89 – 6.74). Therefore, each of the seven production systems were proven to be net contributors to human protein supply, with net protein contribution (NPC) values ranging from 1.52 to 5.63.

Table 2. Measures used in the calculation of the net protein contribution of seven Australian pig production systems, utilising the human-edible proportion values of van Barneveld et al., 2023.

Farm…	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**Australia**
HePp[1], t	348.3	170.6	490.0	1,171.1	743.2	544.2	657.7	4,125,0
HePf, t	641.6	213.7	722.6	1,504.7	1,417,2	717.3	740.5	5,957.6
HePCE	0.54	0.80	0.68	0.78	0.52	0.76	0.89	0.69
DIAASf	33.6	24.0	25.5	16.9	39.4	17.6	18.0	23.9
PQR	3.39	4.74	4.47	6.74	2.89	6.48	6.34	4.77
NPC	**1.84**	**3.78**	**3.03**	**5.24**	**1.52**	**4.92**	**5.63**	**3.30**

[1]HePp, Human-edible protein produced; HePf, Human-edible protein fed; HePCE, Human-edible protein conversion efficiency; DIAASf, digestible indispensable amino acid score fed; PQR, protein quality ratio; NPC, net protein contribution.

The NPC of production systems is a function of social, cultural and regional specifics. To allow comparisons with existing literature the seven Australian production systems were also assessed using the human-edible proportion values published from the UK (Wilkinson, 2011), Austria (Ertl *et al.*, 2015, 2016a) and France (Laisse *et al.*, 2016, 2018a, Table 3). All systems remained as net contributors under these different conditions, although at lower values than published for Australia (van Barneveld *et al.*, 2023). There was also some re-ordering of NPC values as a result of the different social, cultural and regional influences on human use of raw materials.

Table 3. The net protein contribution of seven Australian pig production systems calculated utilising different published human-edible proportion values.

Farm…	A	B	C	D	E	F	G	Australia
van Barneveld[1]	1.84	3.78	3.03	5.24	1.52	4.92	5.63	3.30
Wilkinson	1.14	2.23	1.68	3.03	1.06	1.63	2.38	1.81
Ertl	1.71	3.18	2.00	4.47	1.91	2.31	3.31	2.68
Laisse	1.52	2.49	2.37	3.51	1.36	2.27	5.73	2.49

[1]van Barneveld *et al.*, 2023; Wilkinson, 2011; Ertl *et al.*, 2015, 2016a; Laisse *et al.*, 2016, 2018a

6. Discussion

All seven Australian pig production systems examined was shown to give back more human-edible protein than they used. Each system scored above 1.0, the point that divides a net contribution to human nutrition from net competition with it (Ertl *et al.*, 2016b) and each did so by a wide margin. The farms differed in size, market weight and feed conversion, yet all reached the same result. This tells us the net protein contribution of intensive Australian pork comes from how these systems are fed, not from any one farm.

Protein quality drives this result, not conversion efficiency. Every system had a human-edible protein conversion efficiency (HePCE) below 1.0, so each pig was fed more human-edible protein than it produced. This is what we expect from a monogastric animal, and it is the basis of the usual "feed versus food" argument. The systems became net contributors only once we accounted for the rise in protein quality. The protein fed was low quality, DIAAS well below the no-claim threshold of 75 (FAO, 2011), whereas pork is an excellent-quality protein (DIAAS 113.9; Ertl *et al.*, 2016a). This large quality gap, measured by the protein quality ratio (PQR), lifted every system above 1.0. The contribution of Australian pork is therefore a story of quality conversion: the pig turns low-grade, mostly human-inedible feed protein into complete human protein.

The pooled value matches the NPC value van Barneveld *et al.* (2023) reported for a single intensive Australian pork supply chain, which confirms the size of the effect. Both sit well above published European figures. In Austria, swine scored an NPC of 0.64 with current ingredients and 0.50 with optimum ingredients (Ertl *et al.*, 2016a), in other words, net competitors. French pork ranged from 1.06 (commercial feed mill) to 1.23 (home mill with maize silage; Laisse *et al.*, 2018a), only just above 1.0. The gap between Australia and Europe is large and needs explaining.

The main reason is feed ingredient available to be fed, rather than the biology of the pig or the production system. Australian pig diets rest on a feed base that differs from northern Europe's in three ways. First, processed animal proteins (PAPs), meat meal on all seven farms, with blood and fish meal common, are normal ingredients in Australia but have been largely banned from European pig diets.

PAPs count as zero human-edible yet still supply high-quality protein; van Barneveld *et al.* (2023) traced about 20% of the digestible protein in their supply chain to meat and bone meal alone. Second, Australia produces large volumes of feed-grade and downgraded grain for pig diets: sorghum, very little of which Australians eat; weather-damaged or non-malting barley; and feed wheat. Each is considered as less human-edible than the milling-grade grain assumed in European studies. Third, the pig's omnivorous nature lets it use these by-products, which sets it apart from poultry. Australian poultry, like pork production systems in the USA and South America, leans heavily on imported, human-edible soybean meal. Each difference lowers both the human-edible protein fed (HePf) and its quality (DIAASf), which raises the PQR and the NPC.

The human-edible fraction is the biggest and most arguable assumption in the calculation, so we recalculated all seven systems using value sets from the United Kingdom (Wilkinson, 2011), Austria (Ertl *et al.*, 2015, 2016a) and France (Laisse *et al.*, 2016, 2018a). Every system stayed a net contributor under all of them, with pooled NPCs of 1.81, 2.68 and 2.49, respectively. The main conclusion therefore holds whichever assumptions we use. The lowest values came from Wilkinson (2011), which treats 80% of cereals, pulses and soybean meal as human-edible and gives oilseed meals a non-zero share, raising HePf. Farms also changed rank between the four value sets. This shows that NPC is not fixed for a system: it depends on the regional assumptions made about how raw materials are used, so comparisons between countries need care.

Compared with other animal-protein systems, Australian pork does well against other monogastrics and against intensive ruminants, but not against extensive ruminants. Poultry sits at or below 1.0, broiler chickens 0.76 and turkeys 0.56 (Ertl *et al.*, 2016a); broilers 0.88 and layers 1.02 (Laisse *et al.*, 2018a), because poultry relies on human-edible soybean meal and can use few by-products. Pork also beat grain-finished and intensive ruminant systems, such as Australian grain-finished beef at 1.96 and intensive pasture-based sheepmeat at 0.34 (Thomas *et al.*, 2021; Laisse *et al.*, 2018a). It fell below ruminants fed mainly from non-arable land: low-input pasture dairy reached 2.57 and grassland sheepmeat 1.28 (Laisse *et al.*, 2018a), and fully grass-fed Australian beef was reported at 1597 (Thomas *et al.*, 2021). That last figure has little real meaning, a system that feeds almost no human-edible protein approaches division by zero, so should be treated with caution. But it makes the principle clear: the highest scores belong to animals fed from land that grows no human food, while pork's strong score depends on its access to human-inedible by-products and processed animal proteins.

Several limits apply to these findings. The human-edible fraction depends on region, culture and technology, and it remains the main source of uncertainty. The Australian values used may be conservative, and future ways to turn oilseed meals or manufactured amino acids into human food would lower the NPC of pork (van Barneveld *et al.*, 2023). We calculated human-edible protein produced from standard carcase and offal protein contents (140 and 180 g/kg) and a standard offal recovery applied to every farm, rather than measuring each one. The diet DIAAS also cannot allow for the way ingredients help or hinder each other's digestibility. Finally, the figures come from self-reported data on seven systems and are not a representative national sample. Even so, the result is consistent: every system is a net contributor under every assumption set. This supports the conclusion that intensive Australian pork, returns far more human-edible protein than it uses, and that this depends on continuing to feed materials that compete little, if at all, with human nutrition.

7. Implications & Recommendations

This net protein contribution (NPC) estimate for a group of Australian pig farms is clear and consistent: every system returned more human-edible protein than it used, by a wide margin, under every set of assumptions tested. For the pork industry this is a usable, evidence-based answer to the common claim that pigs compete with people for food. It shows that, as currently fed, Australian pork is a net contributor to human protein supply, and it gives industry a defensible sustainability measure to sit alongside carbon and land-use figures rather than relying on those alone.

The result also comes with a condition. The contribution depends on feeding materials that people cannot or do not eat, processed animal proteins such as meat meal, and feed-grade or downgraded grain. Anything that strips these from pig diets, whether through regulation, competing demand, or new technology that turns oilseed meals and manufactured amino acids into human food, would lower the NPC of pork. Protecting access to these feedstuffs is therefore both a sustainability and a commercial issue.

The Australian pork industry should:

1. Use NPC in sustainability reporting and social-licence communication, alongside, not instead of, carbon and land-use metrics.
2. Defend continued access to processed animal proteins and by-product feedstuffs in regulatory and policy discussions, since these drive the result.
3. Track future risks to the result by monitoring the technologies and markets that could make current pig feedstuffs human-edible.

8. Intellectual Property

There is no intellectual property arising from this project. The MS Excel workbooks developed to calculate net protein contribution are background technology developed by the provider and remain vested solely with the provider.

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10. Publications Arising

There are no publications currently arising from this project.

11. Appendix

Appendix 1. Self-reported raw material inclusion percentage of seven Australian pig production systems included in this study to determine their net protein contribution.

Raw material inclusion, %	A	B	C	D	E	F	G
Barley	26.4	17.8	34.8	11.4	30.6	42.1	12.6
Wheat	30.2	31.2	36.9	37.1	26.4	19.7	25.2
Sorghum							36.7
Maize							0.01
Groats		0.55				0.70	
Millrun		13.7		14.2	4.26	6.59	1.09
Wheat Bran	0.33		0.63				
Rework						0.19	
Concentrate				1.63			
Cereal Gradings	1.14					0.49	
Biscuit/Cereal Meal		1.68		15.1	0.44		
Faba Beans	4.04	7.12	4.07				2.22
Peas			1.43				0.44
Lupins	5.48	1.45	5.97		1.20	10.80	
Pulse Offal							0.20
Peanut Meal							0.24
Canola Meal Expeller	6.75			9.73		9.69	
Canola Meal Solvent		11.1	3.86		6.25		6.89
Canola Whole Seed		1.64	0.00		0.00	0.70	0.00
Full Fat Soyabean	0.52	0.34	0.54	0.00	0.00	0.00	0.50
Soybean Meal	3.72	3.85	1.95	3.97	5.09	1.52	3.23
Selecta Soy						0.15	0.13
Other Vegetable Protein	0.13						
Meat Meal	4.30	1.81	3.87	4.39	1.35	3.94	4.55
Blood Meal		0.89	0.25		0.35		1.05
Fish Meal	1.89	0.38	0.65		0.10	0.21	0.70
Tallow		0.10	1.28			0.56	1.43
Vegetable Oil	0.90	0.82		0.17	0.60	0.07	0.04
Salmon Oil		0.04		0.08	0.15		0.02
Yeast					3.41		
Skim Milk Powder					0.11	0.35	
Whey Powder	0.84	1.00	0.37				0.81
Lactose Powder							0.04
Whole Milk Powder	11.2				16.5		
Raw Sugar			0.28		0.20		0.04
Lysine	0.28	0.57	0.55	0.41	0.42	0.42	0.40
Methionine	0.17	0.13	0.18	0.08	0.11	0.07	0.10
Threonine	0.13	0.17		0.14	0.07	0.11	0.07
Tryptophan	0.03	0.02			0.01		0.02
Isoleucine		0.03		0.01	0.01		0.01
Valine	0.03	0.04		0.01		0.02	
Additives - Low Cost	0.52	2.64	0.73	0.87	0.53	1.13	0.67
Additives - High Cost	0.81	0.52	0.50	0.53	1.56	0.28	0.38
Vitamin/Mineral Premixes	0.26	0.45	1.23	0.27	0.24	0.20	0.20

Appendix 2. Published human-edible proportion values from van Barneveld et al., 2023; Wilkinson, 2011; Ertl et al., 2015, 2016a; Laisse et al., 2016, 2018a

Human edible proportion, %	van Barneveld	Wilkinson	Ertl	Laisse
Barley	60	80	65	61
Wheat	80	80	80	66
Sorghum	20	80	65	15
Maize	80	80	80	15
Groats	80	80	60	84
Millrun	20	20	10	90
Wheat Bran	20	20	10	90
Rework	50	60	60	60
Concentrate	50	60	60	60
Cereal Gradings	20	20	10	15
Biscuit/Cereal Meal	0	0	0	0
Faba Beans	80	80	80	92
Peas	80	80	80	74
Lupins	20	80	80	74
Pulse Offal	50	80	80	74
Peanut Meal	20	80	80	74
Canola Meal Expeller	0	20	0	0
Canola Meal Solvent	0	20	0	0
Canola Whole Seed	0	20	0	0
Full Fat Soyabean	80	80	92	61
Soybean Meal	50	80	71	60
Selecta Soy	80	80	71	60
Other Vegetable Protein	0	0	0	0
Meat Meal	0	0	0	0
Blood Meal	0	0	0	0
Fish Meal	0	0	0	0
Tallow	0	0	0	0
Vegetable Oil	0	0	0	0
Salmon Oil	0	0	0	0
Yeast	20	20	10	20
Skim Milk Powder	80	80	40	80
Whey Powder	80	80	40	80
Lactose Powder	80	80	40	80
Whole Milk Powder	80	80	50	80
Raw Sugar	100	100	100	100
Lysine	0	0	0	0
Methionine	0	0	0	0
Threonine	0	0	0	0
Tryptophan	0	0	0	0
Isoleucine	0	0	0	0
Valine	0	0	0	0
Additives - Low Cost	0	0	0	0
Additives - High Cost	0	0	0	0
Vitamin/Mineral Premixes	0	0	0	0