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WHAT DOES A DRY SEASON MEAN TO THE WESTERN AUSTRALIAN ECONOMY? A CGE INVESTIGATION¹

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ABSTRACT

In this paper, by applying a Computable General Equilibrium model for Western Australia (called WAG), the impact of the 2002 dry season on the State's wider economy is quantitatively analysed. An estimate of 40 percent loss in the production of five major groups of agricultural commodities is simulated into the model. The model results show that the State's economy-wide total production declines by 2.3 percent. In 2001-02 dollar terms this production decline is worth more than \$2.5 billion. The gross state product (GSP) for WA declines by more than one percent. The total value of the State's exports and employment decline by 5.2 and 1.7 percent respectively.

Key words: Agriculture, drought, CGE model

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1. INTRODUCTION

Occurrence of a dry season is a natural phenomenon. When the occurrence is prolonged beyond some critical periods the agriculture and other climate sensitive industries become the direct ‘hard-hit’ victims. In recent years Western Australia is experiencing a series of dry seasons (Coyle and Mayberry, 2003). In 2002 large areas of WA have been affected by the prolonged dry season and this has adversely affected many agricultural industries and other industries that are linked in terms of the flow of goods and services. In this paper, by applying an economy-wide general equilibrium model for WA agriculture called WAG², the effects of the loss in agricultural production on the State’s economy are examined.

2. THE MODEL AND DATABASE

The economy-wide model for WA agriculture, or WAG in short, captures the specific structure of the State economy with a particular focus on the agriculture sector. It accounts for interdependencies among agricultural and other WA industries. WAG models individual commodities (including sheep meat, wool, cereals, pulses & oil seeds, beef, pigs, poultry, horticulture and dairy) produced in the WA economy by explicitly specifying their production processes, input and output demands and trade. The model incorporates constraints applying to the State economy, as well as for specific sectors. Examples include limits on the supply of factors of production and given world prices. The WAG model includes input demands and commodity supplies by industries; commodity demands by households and governments; and the external sectors comprising imports into and exports from WA (see Appendix A and for further details see Ahammad, 2000).

The WAG database is made up of various shares and elasticities. To calculate the shares, the model uses the most recent input-output table for WA that refers to the year 1994-95, developed at the UWA Economic Research Centre³. This table represents the present-day State economy. The input-output table has 108 industries and as many commodities. WAG incorporates one (broadacre) Agriculture industry, which jointly produces nine commodities

² This model has been developed by the Economic Research Centre (ERC) at the University of Western Australia in collaboration with Agriculture WA (see Ahammad (2000) for more about WAG).

³ The original input-output table by Islam and Johnson (1997) has been updated in 2002 at the ERC.

(see Appendix A). Also, based on the rationale in Dixon *et al.* (1982, p.176), the model considers one fictitious local industry called “Complementary (non-competing) imports”.⁴ Hence, the original input-output table has been modified to represent 101 industries and 109 commodities. The list of WAG commodities and industries is given in Table A3 in Appendix A. The cost structure of WAG industries and the sales structure of WA commodities based on the modified input-output table⁵ are given in Ahammad (2000).

One noteworthy feature of WAG is the empirical basis of its Agriculture sector. The core output supply and input demand elasticities are adopted from the econometric estimates by Ahammad and Islam (1999) and Dixon *et al.* (1982). The sources and methods used for various elasticities to represent Agriculture; and the non-Agriculture sectors in WAG is described by Ahammad (2000) in detail.

To examine the effect of 2002 dry season an estimate of 40 percent loss in five top-level agricultural commodities (i.e. Sheep, Wool, Grains, Beef and other meat and All other agricultural commodities) is used to simulate the WAG model. The model was simulated separately for each of these five individual commodities and also simulated jointly for all the commodities.

By applying the stylized Johanson method the WAG model was simulated using GEMPACK –7.0, a computer software package (Harrison and Pearson, 2000).

⁴ The industry is modelled to produce a negligible quantity.

⁵ The complete input-output table is available on request from the author.

3. THE RESULTS

Effects on agricultural commodities

Table 1 shows the price and production effects of five major agricultural commodities. The price effects indicate that own-prices for each of the commodities increased due to their respective loss in production. The price for Beef and other meat increased significantly by more than five percent. In terms of cross-price changes, the effects are also mostly positive. A few negative effects could be due to cross-price elasticities of agricultural output supply used in the database.

The cross-effects on production loss reveals that although the share in the gross value of agricultural production (GVAP) of the other agricultural commodities is very small, its declined production reduces the production of all the other four commodities (see column 6). Although the GVAP share for the Grains is about 50 percent, its loss in production positively affects the sheep and wool industries (see column 4).

Macroeconomic effects

The effects on important macroeconomic variables are presented in Table 2. As the agricultural industries in the model are linked with other sectors of the economy, the initial impact of the production loss is likely to lower demands for inputs by these industries which, in turn, forces other related industries to scale down their output and employment. Table 2 reveals that all the macroeconomic variables: GSP, CPI, employment, imports and exports have declined due to loss in the individual as well as in the total production of agricultural commodities. This is because of its larger share (close to 50 percent) in the GVAP. Loss in the production of Grains affected all the macroeconomic variables the most. There is however an exception. Employment has declined the most (0.58 percent, see column 4) due to the loss in Beef and other meat production. The reason perhaps is its linkage with the labour intensive meat-processing sector.

TABLE 1
TYPICAL YEAR EFFECTS OF 40 PERCENT PRODUCTION LOSS
IN WA AGRICULTURAL ON COMMODITY PRICES AND PRODUCTION¹
(Percent change)

Affected commodities	Shocked Commodities					
	Sheep meat	Wool	Grains	Beef & other meat	Other Agriculture	All Agriculture
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Price effect</i>						
Sheep meat	0.89	0.00	-0.02	-0.24	0.01	0.62
Wool	0.00	0.59	-0.01	-0.01	0.05	0.58
Grains	0.00	0.00	1.01	0.01	0.01	1.01
Beef & other meat	-0.18	0.01	0.05	5.10	0.00	4.94
Other Agriculture	0.00	0.02	-0.01	0.01	2.68	2.61
<i>Production effect</i>						
Sheep meat	Shock	-0.02	0.07	0.15	-0.16	-3.8
Wool	-0.01	Shock	0.02	0.01	-0.38	-6.25
Grains	0.23	0.31	Shock	-0.25	-0.39	-18.06
Beef & other meat	-0.55	0.45	-0.38	Shock	-0.44	-5.08
Other Agriculture	-0.7	-3.45	-0.23	-0.27	Shock	-3.89

Note:

1. The percentage changes are relative to 1994/95 (the base year) levels.

Overall, the GSP declined by 1.03 percent (see column 2). This, in 2001/02 dollar terms, means that WA's gross value of production will be lower by more than \$500 million⁶. Lower GSP means lower income and lower overall consumption, which results in reduced demand for consumer goods and intermediate inputs. In turn this means less imports. As indicated in Table 2, the aggregate imports declined by 1.58 percent. The aggregate exports on the other hand declined significantly by more than five percent. This reflects the export-orientation of the WA agricultural industries.

TABLE 2
TYPICAL-YEAR MACROECONOMIC EFFECTS OF
40 PERCENT PRODUCTION LOSS IN WA AGRICULTURE
(Percent change)

Shocked commodities	Real GSP	CPI	Employment	Imports	Exports
(1)	(2)	(3)	(4)	(5)	(6)
Sheep meat	-0.11	-0.18	-0.13	-0.17	-0.47
Wool	-0.19	-0.29	-0.23	-0.26	-0.77
Grains	-0.31	-0.74	-0.49	-0.68	-2.26
Beef & other meat	-0.29	-0.35	-0.58	-0.35	-0.91
Other Agriculture	-0.16	-0.35	-0.28	-0.17	-0.96
All Agriculture	-1.03	-1.86	-1.67	-1.58	-5.24

Note:

1. The percentage changes are relative to 1994/95 (the base year) levels.

Source: WAG simulations

Effects on WA economic structure

Table 3 shows that the Forestry, logging and fishing and Mining have expanded while all the broad industry sectors contracted due to production loss in WA agricultural commodities. The reason for the expansion of these two industries can be explained in term of the 'Gregory effect' (Gregory, 1976) i.e. when the highly export-oriented agricultural sector shrinks and its

⁶ Note that this amount is likely to be lower than the loss of GVAP. GSP is the value of final goods and services while GVAP includes the value in intermediate goods also.

export is significantly reduced, the exchange rate in real terms depreciates and thus boosts exports of other export oriented sectors of the economy, such as Mining.

In general, the extent of effects generated from the loss of Grains production is relatively higher on other sectors of the economy (see column 4). In terms of affected sectors however, the agricultural processing sector became the most adversely affected. This is particularly high for the production loss in Beef and other meat commodities (see column 5 of Table 3). Overall loss in the State's agricultural production reduces the State's value of output by 2.31 percent (Column 7 of Table 3). This, in 2001/02 dollars terms means that a total of \$2.6 billion worth of output is lost from the economy (see appendix Table A4 the detail loss in dollar terms by broad industry sectors).

4. CONCLUDING COMMENTS

In recent years Western Australia has been experiencing a series of prolonged dry seasons, which have severely reduced agricultural production in many regions of the State. While the severity varied from region to region and enterprise to enterprise, an average of 40 percent reduction in WA agricultural output in 2002 is estimated. Given the GSP share of agriculture is little more than four percent, a 40 percent reduction in agricultural output is estimated to reduce the GSP, directly by slightly less than one percentage point. Hence, out of total 1.03 percent reduction in GSP if we take away the direct effect of less than one percent, the rest is the indirect negative multiplier effect.

In a recent Australia wide study Adams *et al.* (2002) found similar results for Western Australia by applying the MONASH model with new regional modelling components, labelled TERM. In their simulation however, they have used 30 percent reduction in production.

Reduction in agricultural production also significantly reduces the level of aggregate employment and exports. Since the Grains industry's share of GVAP is almost 50 percent, a significant percent of its production loss adversely affects the State economy compared to the loss in other agricultural commodities. Although agricultural processing industry's share in the GSP is significantly low (Islam 2003), a decline in agricultural production affects it severely..

TABLE 3
TYPICAL-YEAR EFFECTS OF 40 PERCENT PRODUCTION LOSS
IN WA AGRICULTURAL ON SECTORAL PRODUCTION¹
(Percent change)

Affected broad sectors	Shocked Commodities					
	Sheep meat	Wool	Grains	Beef & other meat	Other Agriculture	All Agriculture
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agriculture	-3.80	-6.25	-18.06	-5.08	-3.89	-36.18
Dairy	-0.28	0.06	-0.05	-34.89	-0.21	-34.97
Services to agriculture	-0.10	-0.06	-0.43	-1.87	2.06	-0.43
Forestry, logging & Fishing	0.01	0.01	0.03	0.02	0.01	0.07
Mining	0.00	0.01	0.02	0.01	0.01	0.04
Agriculture processing	-0.19	0.04	0.02	-8.07	-0.40	-8.49
Other manufacturing	-0.04	-0.06	-0.14	-0.07	-0.07	-0.37
Trade and transport	-0.12	-0.19	-0.47	-0.41	-0.22	-1.38
Financial and business services	-0.15	-0.24	-0.60	-0.30	-0.24	-1.48
Other services	-0.07	-0.12	-0.28	-0.17	-0.14	-0.77
Total	-0.21	-0.33	-0.90	-0.66	-0.27	-2.31

Note:

1. The percentage changes are relative to 1994/95 (the base year) levels.

Source: WAG simulations.

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Appendix A

THE WA MODEL FOR AGRICULTURE

The economy-wide model used for simulating the broader effects of growth in WA agriculture is called WAG. In this section a brief description of the main features and assumptions of the model is presented. The details on WAG are available in Ahammad (2000).

WAG is a single-region, multi-sectoral computable general equilibrium (CGE) model of the WA economy. The theoretical structure of the model is of ORANI (Dixon *et al.*, 1982) type, except that ORANI is a single-country model for Australia. As a CGE model, WAG captures the linkages among WA industries in some detail. It incorporates explicitly the decisions made by producers and consumers, embodies relevant government policies and recognises the constraints the economy confronts, such as limited supplies of the primary factors of production. At the core of WAG are (i) input demands by industries and their commodity supplies; (ii) demands for commodities by households and government; and (iii) the external sector comprising imports into and exports from WA.

WAG is an extension of the WA model called WAM (Clements *et al.*, 1996, Ye, 1998). The extension gives a more detailed coverage of the State's agricultural sector. More specifically, the theoretical structure of WAG is the same as that of WAM except for the specification of the production technology of the agricultural sector and the industry/commodity classification and coverage.

WAG has 101 industries, of which all but two are non-agricultural. The two agricultural industries are broadacre agricultural (henceforth Agriculture for short) and Dairy. Agriculture produces nine commodities (see Table A1) based on a technology described below. Accordingly, with a multi-product Agriculture industry, WAG has more commodities (109) than industries (101).

WA agriculture in WAG

The joint-production⁷ nature of Agriculture distinguishes it from the non-Agriculture industries. The specification of the joint-production technology for WAG Agriculture is based on the optimising assumption that a representative farm chooses a combination of output and input quantities so as to maximise its profit given a set of prices for outputs and inputs (characterising competitive markets for outputs and inputs), and fixed factors (i.e., the area of land holdings and the capital stock, characterising a short run) and the level of technology. The distinguishing feature in this optimisation problem is that the agricultural firm chooses the output mix simultaneously with the input mix. By comparison, a non-Agriculture firm does not have to choose the output mix as it produces only one good.

TABLE A1
COMMODITIES AND INDUSTRIES IN WAG

Commodity		Industry
(1)		(2)
1. Sheep meat	}	1. Agriculture
2. Wool		
3. Cereals		
4. Pulses & oilseeds		
5. Beef cattle		
6. Pigs		
7. Poultry		
8. Horticulture		
9. New industries & other agriculture		
+ 100 other commodities ¹		+ 100 other industries ¹

Note:

1. Includes Dairy. The sector is treated as a single-product industry in WAG. For the complete lists of WAG commodities and industries see Table A1.

Source: Ahammad (2000)

⁷ The jointness is used to mean jointness in input quantities and to imply that decisions about production of one commodity are dependent on those about the production of other commodities. Note that one farm producing many outputs does not necessarily mean jointness in input quantities.

WAG considers a three-level nested production technology for Agriculture as presented in Figure A1. In other words, the choice problem of the farm in WAG is modelled to entail the following three-level production decision making process as follows:

At the top, the farm chooses the quantities of five outputs, the amount of labour and the level of composite materials & services so as to maximise its profit, given a production technology, the prices of inputs and outputs and the supply of an input which is a composite of land and capital. The five top-level outputs are Sheep meat, Wool, Grains, Beef & other meat, and Agriculture n.e.c. (column 1 in Table A2).

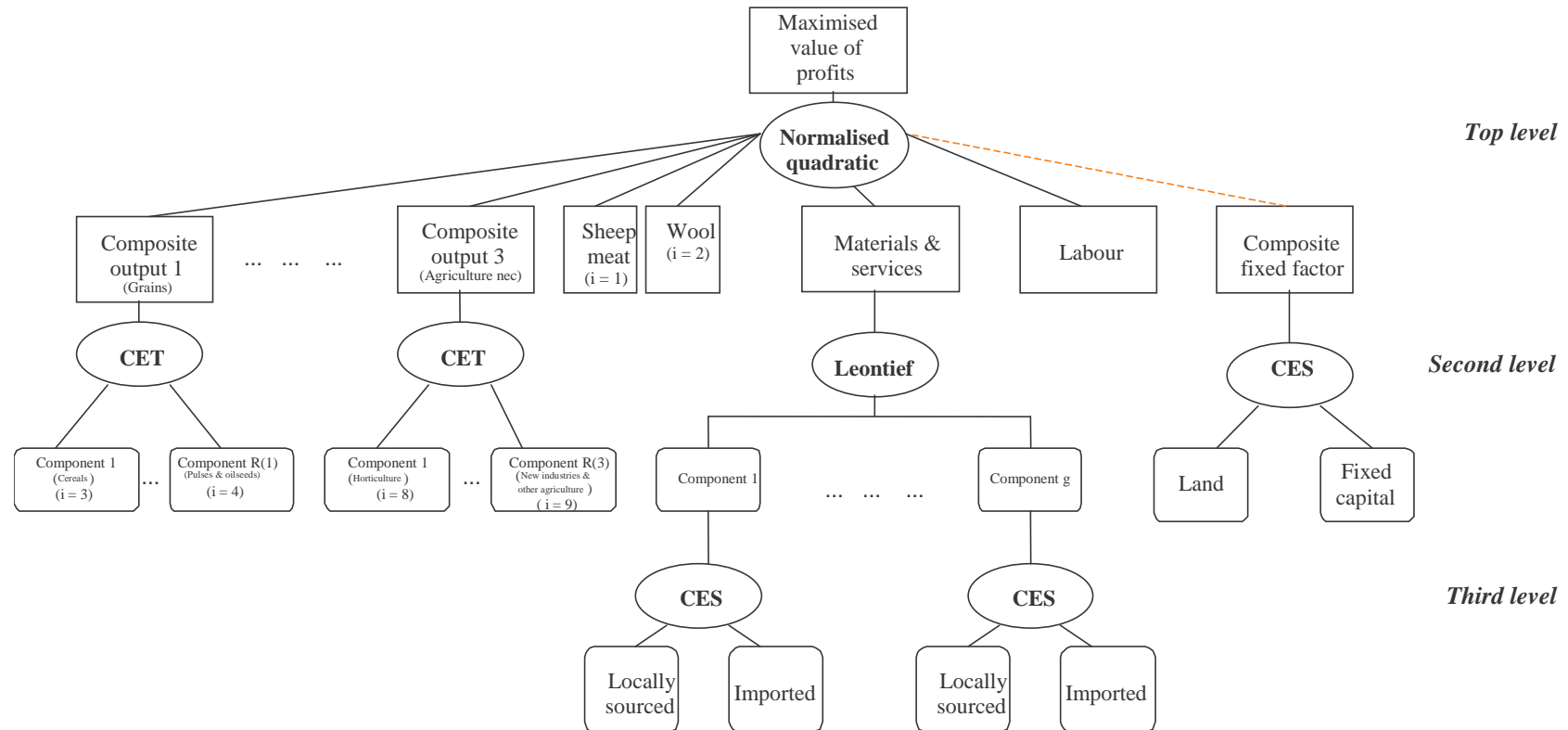
At the second level, given the quantities of the composite outputs and inputs from above, the farm chooses the quantities of their components such that:

- (a) A composite crop is a CET (constant elasticity of transformation) aggregate of its components. Table A2 presented the list of three composite crops (numbered 3, 4 and 5) and their components. Accordingly, the output Grains is a CET composite of two commodities namely Cereals and Pulses & oilseeds; Beef & other meat is a CET composite of three commodities namely Beef cattle, Pigs and Poultry; and Agriculture n.e.c. is a CET composite of Horticulture and New industries & other agriculture.
- (b) The composite materials & services input is a Leontief aggregate of the individual intermediate inputs i.e., the individual inputs are combined into the composite in fixed proportions.
- (c) The only fixed primary input is a CES (constant elasticity of substitution) aggregate of its components – land and capital.

At the bottom, the individual intermediate inputs are chosen from local and imported sources so that each individual material input is a CES aggregate of the same commodity from both local and imported sources.

FIGURE A1

PRODUCTION TECHNOLOGY FOR WAG AGRICULTURE



- Notes:
1. The nine WAG commodities listed in Table 4.1 are denoted by $i = 1, \dots, 9$.
 2. At the top panel, the dotted line for the composite fixed factor denotes that the factor, unlike other netputs at the top level, is fixed in supply in the short run and not determined in the farm's profit maximisation process.

Source: Ahammad (2000)

Other aspects of WAG

As regards the non-Agriculture industries, each of them produces a single commodity using materials, labour and capital as inputs so as to minimise costs subject to a nested production technology. All producers face competitive markets. The production structure is based on the assumption of constant returns to scale and that each of the material inputs is separable from the others, as well as from primary inputs. Substitution takes place between the primary factors. WAG considers consumers who own primary factors, and a consolidated government which collects revenue and spends on current consumption. Household consumption demand is based on the assumption of preference independence and utility maximisation. All goods are distinguished according to their source of supply, WA and non-WA. Locally sourced good is treated as an imperfect substitute for imports. WAG can be viewed to comprise four main building blocks:

TABLE A2
WAG COMMODITY MAPPING

Top-level WAG Commodity	Commodity component
(1)	(2)
1. Sheep meat	1. Sheep meat
2. Wool	2. Wool
3. Grains	{ 3. Cereals 4. Pulses & oilseeds
4. Beef & other meat	{ 5. Beef cattle 6. Pigs 7. Poultry
5. Other Agriculture n.e.c.	{ 8. Horticulture 9. New industries & other agriculture

Note: The prefix numbers (1 to 9) in the second column are according to Table 1.

Source: Ahammad (2000)

- Equations describing the final demands for consumption, investment and government expenditure; and equations describing industrial demands for intermediate inputs and primary factors.
- Zero profit equations which ensure that revenue equals costs, as implied by competitive markets.
- Market clearing-conditions for domestically produced goods and primary factors.
- Miscellaneous definitional equations for prices, revenue from taxation, gross state product, total consumption and total trade.

TABLE A3

WAG'S COMMODITIES AND INDUSTRIES

WAG commodity		WAG industry	
1	Sheep meat	1.	Agriculture
2	Wool		
3	Cereals		
4	Pulses & oilseeds		
5	Beef cattle		
6	Pigs		
7	Poultry		
8	Horticulture		
9	New industries & other agriculture		
10	Dairy	2	Dairy
11	Services to agriculture; hunting & trapping	3	Services to agriculture; hunting & trapping
12	Forestry & logging	4	Forestry & logging
13	Commercial fishing	5	Commercial fishing
14	Coal	6	Coal
15	Oil & gas	7	Oil & gas
16	Iron ore	8	Iron ore
17	Non-ferrous metal ore	9	Non-ferrous metal ore
18	Other mining	10	Other mining
19	Services to mining	11	Services to mining
20	Meat & meat products	12	Meat & meat products
21	Dairy products	13	Dairy products
22	Fruit & vegetable products	14	Fruit & vegetable products
23	Oils & fats	15	Oils & fats
24	Flourmill products & cereal foods	16	Flourmill products & cereal foods
25	Bakery products	17	Bakery products
26	Confectionery	18	Confectionery
27	Other food products	19	Other food products
28	Soft drinks, cordials & syrups	20	Soft drinks, cordials & syrups
29	Beer & malt	21	Beer & malt
30	Wine & spirits	22	Wine & spirits
31	Textile fibres, yarns & woven fabrics, Wool scouring	23	Textile fibres, yarns & woven fabrics, Wool scouring
32	Textile products	24	Textile products
33	Knitting mill products	25	Knitting mill products
34	Clothing	26	Clothing
35	Footwear	27	Footwear
36	Leather & leather products	28	Leather & leather products
37	Sawmill products	29	Sawmill products
38	Other wood products, Plywood, veneer & fabricated wood	30	Other wood products, Plywood, veneer & fabricated wood
39	Pulp, paper & paperboard	31	Pulp, paper & paperboard
40	Paperboard containers & other paper products	32	Paperboard containers & other paper products
41	Printing & services to printing	33	Printing & services to printing
42	Publishing; recorded media & publishing	34	Publishing; recorded media & publishing
43	Petroleum & coal products	35	Petroleum & coal products
44	Other basic chemicals, Fertilisers	36	Other basic chemicals, Fertilisers
45	Paints	37	Paints
46	Medicinal, pharmaceutical & chemical products	38	Medicinal, pharmaceutical & chemical products
47	Soap & other detergents	39	Soap & other detergents
48	Cosmetics and toiletry preparations	40	Cosmetics and toiletry preparations
49	Other chemical products	41	Other chemical products
50	Rubber products	42	Rubber products
51	Plastic products	43	Plastic products
52	Glass & glass products	44	Glass & glass products
53	Ceramic products	45	Ceramic products

(continued on next page)

TABLE A3 (continued)
WAG'S COMMODITIES AND INDUSTRIES

WAG commodity		WAG industry	
54	Cement & lime, Concrete slurry	46	Cement & lime, Concrete slurry
55	Plaster & other concrete products	47	Plaster & other concrete products
56	Other non-metallic mineral products	48	Other non-metallic mineral products
57	Iron & steel	49	Iron & steel
58	Basic non-ferrous metals & products	50	Basic non-ferrous metals & products
59	Structural metal products	51	Structural metal products
60	Sheet metal products	52	Sheet metal products
61	Fabricated metal products	53	Fabricated metal products
62	Motor vehicles & parts	54	Motor vehicles & parts
63	Ships & boats	55	Ships & boats
64	Railway equipment	56	Railway equipment
65	Aircraft	57	Aircraft
66	Photographic & scientific equipment	58	Photographic & scientific equipment
67	Electronic equipment	59	Electronic equipment
68	Household appliances	60	Household appliances
69	Other electrical equipment	61	Other electrical equipment
70	Agricultural Mining & construction machinery & equip.	62	Agricultural Mining & construction machinery & equip.
71	Other machinery & equipment	63	Other machinery & equipment
72	Prefabricated buildings	64	Prefabricated buildings
73	Furniture	65	Furniture
74	Other manufacturing	66	Other manufacturing
75	Electricity supply	67	Electricity supply
76	Gas supply	68	Gas supply
77	Water supply; sewerage & drainage services	69	Water supply; sewerage & drainage services
78	Residential building construction	70	Residential building construction
79	Other construction	71	Other construction
80	Wholesale trade	72	Wholesale trade
81	Retail trade	73	Retail trade
82	Accommodation, cafes & restaurants	74	Accommodation, cafes & restaurants
83	Road transport	75	Road transport
84	Rail, pipeline & other transport	76	Rail, pipeline & other transport
85	Water transport	77	Water transport
86	Air & space transport	78	Air & space transport
87	Services to transport; storage	79	Services to transport; storage
88	Communication services	80	Communication services
89	Banking	81	Banking
90	Non-bank finance	82	Non-bank finance
91	Financial asset investors	83	Financial asset investors
92	Insurance	84	Insurance
93	Services to finance, investment & insurance	85	Services to finance, investment & insurance
94	Ownership of dwellings	86	Ownership of dwellings
95	Other property services	87	Other property services
96	Scientific research, technical & computer services	88	Scientific research, technical & computer services
97	Legal, accounting, marketing & management services	89	Legal, accounting, marketing & management services
98	Other business services	90	Other business services
99	Government administration	91	Government administration
100	Defence	92	Defence
101	Education	93	Education
102	Health services	94	Health services
103	Community services	95	Community services
104	Motion picture, radio & television services	96	Motion picture, radio & television services
105	Libraries, museums & the arts	97	Libraries, museums & the arts
106	Sport, gambling & recreational services	98	Sport, gambling & recreational services
107	Personal services	99	Personal services
108	Other services	100	Other services
109	Complementary imports CIF	101	Complementary imports CIF

TABLE A4
TYPICAL YEAR EFFECTS OF 40 PERCENT PRODUCTION LOSS
IN WA AGRICULTURAL ON SECTORAL PRODUCTION¹
(In \$'000)

Sector	Sheep meat	Wool	Grains	Beef & other meat	Other Agriculture	All Agriculture
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agriculture	-155,848	-256,160	-739,948	-208,271	-159,347	-1,481,965
Dairy	-435	97	-78	-54,908	-325	-55,030
Services to agriculture	-233	-140	-1,001	-4,327	4,784	-1,001
Forestry, logging & Fishing	40	62	1,64	126	41	424
Mining	599	948	2,409	1,725	919	6,443
Agriculture processing	-6,877	1,420	774	-299,562	-14,723	-315,114
Other manufacturing	-5,870	-9,923	-22,397	-10,592	-10,478	-57,716
Trade and transport	-21,093	-32,965	-83,594	-72,860	-38,479	-243,164
Financial and business services	-5,873	-9,505	-24,061	-12,231	-9,537	-59,681
Other services	-37,788	-61,930	-145,145	-85,668	-73,153	-393,472
Total	-233,379	-368,097	-1,012,876	-746,567	-300,298	-2,600,276

Notes:

1. The percentage changes are relative to 1992/93 (the base year) levels.
2. Refers to the composite price of a good from both local and imported sources. The consumers' price for locally produced commodities includes sales taxes on the top of the corresponding producers' price.

Source: WAG simulations.