GATT: IMPLICATIONS FOR FARMERS IN THE NORTHERN WHEATBELT OF WA †

Cameron Tubby[1]

Roy Murray-Prior[1]

Amir Abadi[2]

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[1] Honours student and Lecturer respectively, Muresk Institute of Agriculture, Curtin University of Technology, Northam, WA.

[2] Department of Agricultural and Resource Economics, University of Western Australia, Perth.

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Abstract

The influences of the Uruguay round of GATT on prices for farmers in the north-eastern wheatbelt of Western Australia were identified. A MIDAS model for the north-eastern wheatbelt was used to analyse the effect of these changes on farm profitability and on the profit maximising enterprise mix for these farms. Limited change in the enterprise mix is predicted as a result of GATT but significant increases in net returns are expected.

Keywords: GATT, MIDAS, wheatbelt, Western Australia

1 Introduction

On the December 15 1993 the most recent round of GATT (General Agreement On Tariffs and Trade), the Uruguay Round concluded. This round has been hailed as possibly the biggest world wide deal in history on international trade. It is believed to have significant benefits for the world economy, which included benefits for Australian agriculture. As an example Australia's major farm sectors are expecting benefits worth some $1 billion a year (Young 1994). The significance of the round is expressed in the remarks of the GATT General Director, Peter Sutherland, when he called the successful conclusion of the Uruguay Round "a defining moment in modern economic and political history" (Anon 1993, pp. 2-3). Similar comments were made by the United States representative to GATT, when on the final day he said "having gone through the very real and difficult negotiating process, the hope that is here tonight is real and it is a real hope of better lives for people throughout the world" (Anon 1993, pp. 2-3).

If the Australian agricultural sector and some very influential people in world politics have expressed their enthusiasm about its potential, the question should be asked, how

big an influence will it have on the individual farmer? This paper reports research that tried to answer this question for the farmers of the north-eastern wheatbelt of Western Australia. In particular, emphasis was placed on the likely impact on the most profitable enterprise mix for their farms.

1.1 Research objectives

In answering the question as to what the implications for farmers in the north-eastern wheatbelt will be following GATT the objectives were to:

a) Identify the outcomes of GATT on the major barriers to trade in wheat, lupins, wool, sheepmeat, farm chemicals, fertilisers and fuel and their implications for prices of these products in Western Australia.

b) Determine the impact of GATT on the most profitable mix of enterprises for a typical north-eastern wheatbelt.

1.2 Research hypotheses

The Uruguay Round agreements are to be fully completed and the full extent of any changes is expected to be experienced by the year 2005. In this paper it is assumed that the agreements are fully implemented. We made two hypotheses about the likely effects of GATT on the most profitable enterprise mix. These were:

1. The Uruguay Round of GATT will have no effect on the most profitable mix of enterprises on a north-eastern wheatbelt farm.

2. The Uruguay Round of GATT will have no effect on the profitability of the enterprise mix of a north-eastern wheatbelt farm.

1.3 Outline of paper

The background to changes in GATT arising from the Uruguay round and its impact on input and output prices are discussed briefly. We present the results and conclusions of research using a version of the MIDAS model developed for a representative farm in the north-eastern wheatbelt.

2 GATT

The foundations of GATT were laid before and during the second World War. Joint negotiations between the US and the British at the end of World War II set the foundations of GATT. It began in 1948 with 23 signatories (Oxley 1990).

In the first 25 years of GATT's life, it was responsible for a remarkable reduction in tariffs and quantitative restrictions. There were seven rounds of GATT before the Uruguay round. It lasted some seven years, three months and 25 days before negotiations ended on the 15 of December 1993. By the end of the round some 116 countries were involved in the negotiations and were signatories to GATT. Combined, this group of countries amounted to some 90 percent of world trade (Department of Foreign Affairs and Trade 1993; Dunkel 1987).

2.1 Focus of the Uruguay Round

The previous seven rounds of GATT largely ignored agricultural products in the liberalisation process. This is because at the inception of GATT many countries made it a pre-condition for their participation in negotiations that special waivers and protocols be granted for agriculture (UN 1990). Because of the failure in previous rounds to address agriculture fully, the Uruguay Round faced serious problems with world agricultural trade. Subsidy-induced over production by some countries led to an increased use of export subsidies, which were displacing efficient producers from their traditional markets. At the same time, non-tariff barriers were used increasingly to distort trade (Anon 1994).

As a result, the Uruguay Round's focus was on the liberalisation of agricultural trade. The aim was to reverse the mounting budgetary costs to governments of agricultural support policies and reduce the increasing friction and disputes regarding trade in agriculture products among the major trading nations (UN 1990).

The intention of the Agreement on Agriculture (one of five out of 18 agreements assessed as influencing agriculture) was to benefit all agricultural products by improving market access and reducing the level of domestic support and export

subsidies (DPI 1994). For developed countries the agricultural reforms are to be implemented over six years, beginning in 1995 (Doyle, Andrews and Fisher 1994). Developing countries will implement their reforms over 10 years and least developed countries are exempt from any reduction commitments (Andrews, Roberts and Hester 1994).

3 Uruguay Round's Impact on Australian Agriculture

Australia is estimated to receive substantial benefits from the Uruguay Round. It stands to gain A$5 billion a year in total exports, 50,000 jobs and a A$3.7 billion boost to its gross domestic product (Fray 1994). Australia's key farm sectors will receive possibly the biggest boost of all economic sectors from the Round. Andrews et al. (1994) estimate that by the end of the implementation period Australia can expect to receive an extra A$330 million in beef exports, A$210 million in dairy products, A$320 million in wheat, A$50 million in course grains and A$30 million in rice exports.

A large percentage of the benefits to Australia will stem from significant tariff cuts by its trading partners. They will average between 30 to 40 percent, but cuts by the major trading partners are likely to average as high as 54 percent. An important point for Australia is that the benefits it will receive will not come at a cost by having to reduce its own tariffs, as Australia has very few tariffs on agricultural products (Gill 1994).

3.1 Implications of GATT for wheat

World trade in wheat has never been free of intervention. The last 10 years has seen the distortion in world wheat trade increase dramatically due to the three major wheat exporting nations embarking on significant increases in their levels of protection. The EU has increased the range of subsidy programs through its restitution system, the US have a number of important domestic support schemes and export subsidy programs, the most significant being the Export Enhancement Program (EEP), and the Canadians have introduced two multi-billion dollar support programs (Ahmadi-Esfahani, Jensen and Stanmore 1994).

Protection methods employed by the major wheat producing nations have significantly reduced world wheat prices and Australia's market share. Australia is a relatively small producer of wheat in what appears to be an oligopolistic marketplace dominated by the three big producers, US, EU and Canada. Ahmadi-Esfahani et al. (1994) suggest that the protection policies of these major producers have created a combination of reduced export volumes and premium prices received by Australian wheat producers, hence adversely affecting their returns. In these circumstances Australia stands to gain considerably from the freeing up of trade following the Uruguay Round of GATT (Ahmadi-Esfahani et al. 1994).

The conclusion of the Uruguay Round of GATT and its Agreement on Agriculture will have a positive effect on the world wheat price. A combination of increased market access, reduced domestic support and a reduction in the level of subsidised wheat in the world market will lead to a moderate increase in wheat prices. Predicting the exact increase in world prices is difficult. Several sources have made estimates on how wheat prices might differ from what they would have been without a successful GATT conclusion. A summary of these estimates can be seen in Table 1.

Table 1 Estimated effects of GATT on wheat prices (% change)

Source	Long-run price change
Andrews et al. 1994	8
Andrews and Roberts 1992	11
Goldin et al. 1993	4
Nixon and Rae 1994	7
Vanzetti, Andrews, Hester and Fisher 1993	6

The estimated increase in world wheat prices by Andrews and Roberts (1992) and Andrews et al. (1994) and Vanzetti et al., (1993) are based on the SWOPSIM World

Agricultural Trade Model. The SWOPSIM is a model developed by the US Department of Agriculture that simulates world agricultural trade. Models developed using the SWOPSIM framework are based on the assumption that world prices are determined so as to balance supply and demand in international and in all domestic markets. They take into account protective arrangements and other policies that distort prices facing producers and consumers in each country or region included in the model (Andrews and Roberts, 1992).

Golden et al., (1993) used a global economic model called RUNS (Rural/Urban-North/South model) that placed strong emphasis on agriculture to get their estimated increase in world wheat prices

3.2 Implications of GATT for lupins

Since 1979 the use of lupins in the north-eastern wheatbelt has become firmly established in the farming system (Nelson and Delane 1990). The benefits to farmers of including lupins into a rotational policy are now well understood, and in many cases financial returns from lupins are better than other alternative land uses (Meyerink 1994).

The biggest importer of Australia's lupins is the European Union (EU). Over the past three years Australia has marketed between 47 percent and 62 percent of its exports to the EU. Other large consumers of Australia's lupins are Japan and Korea with some 120,000 tonnes and 121,000 tonnes being imported from Australia respectively (Orr 1994).

Soybeans are regarded worldwide as the best form of protein meal, with the US the world's largest exporter. With lupins also being a good source of protein, lupins and soybeans are regarded as substitutes (Nelson and Delane 1990). Soybean meal represents about 60 percent of world meal production and 75 percent of world meal trade (Nelson and Delane 1990). It is assumed that as lupins are a close substitute source of protein, the price of lupins will be closely tied to soybean prices (Fraser, 1994 pers. comm.; Orr 1994).

It appears the GATT Agreement on Agriculture is unlikely to affect lupins directly. Since the price of lupins and soybeans are closely tied to each other, we used the changes in the price of soybeans following the Uruguay Round as a guide to the change in the price of lupins. It was necessary to do this because there has been very little global analysis done on the effects of GATT on lupins.

Table 2 shows the various estimates of lupin and soybean price changes from the Uruguay Round of GATT. These increases range from 1 to 3 percent.

Table 2 Estimated effects of GATT on lupins and soybean prices (% change)

Source	Long-run price change
Vanzetti et al. 1993	1
Goldin et al. 1993	2.6
Andrews and Roberts 1994	1
Nixon and Rae 1994	2

3.3 Implications of GATT for wool

GATT does not have a direct impact on wool, although it does affect it indirectly through other areas of the Uruguay Round agreements. Protection for wool in its raw state is relatively low in most countries, therefore reduction in support for raw wool would not lead to significant changes in world wool prices. Where wool will be affected is through changes in the world wide protection of textiles and clothing. The increase in demand for textiles and clothing will lead to an increase in demand for raw fibres such as wool and consequently a change in their world prices (Andrews and Roberts 1992).

The effects that the Uruguay Round of GATT will have on wool prices has been difficult to determine, given that its effects are derived from the changes in the textile and clothing sectors. Two known estimates of changes to wool prices come from Short,

Morris, Roper, Harris and Leu (1991) and Goldin, Knudsen, and Van der Mensbrugghe (1993). Their estimated changes in price are presented in Table 3.

Table 3 Estimated short and long-run effects of GATT on wool prices (% change)

Source	Long run price change
Short et al., 1991	0.62
Goldin et al., 1993	0.4-1.6

The changes in wool prices estimated by Short et al. (1991, p. 82) are the effects in Australia if only the US removed its tariffs and quotas (MFA) on textiles and clothing. Given that the Uruguay Round of GATT agreements removed more than just the US textile and clothing protection measures, the percentage change for the long run may be larger than indicated.

Changes in wool prices estimated by Goldin et al. (1993, p. 99) are for world wide prices. To get to this conclusion Goldin et al. used a global economic model called RUNS (Rural/Urban-North/South model), that placed strong emphasis on agriculture . The model was used to investigate the changes of world agricultural prices with the changes projected to be implemented in the Uruguay Round. Since the model was run in early 1993, before the round had concluded, Goldin et al. estimated an across-the-board reduction of tariffs and input subsidies by 30 percent for all commodities in the agricultural and non-agricultural sectors. Although the assumptions of the Uruguay Round were not 100 percent correct, they believe the estimations are still a very good guide to wool price changes.

The implications of GATT for wool appear to be positive. Under the commitments of the Agreement on Textiles and Clothing, tariffs will be reduced on both wool and wool products and the phasing out of the Mulitfibre agreement will be completed by 2005. This is likely to have significant benefits for the textile and clothing industry. Some of the benefits for textiles and clothing are expected to filter down to the wool industry in

the way of increased demand and prices. Unfortunately, the expected price increase appears to be minimal, somewhere in the range of one half through to two percent.

3.4 Implications of GATT for sheepmeat

Mutton is generally regarded as a secondary product to wool from sheep enterprises in the north-eastern wheatbelt. Production of mutton is closely related to the strength of the wool industry (DAWA 1994). When wool prices are high, producers tend to hold onto sheep stocks in an attempt to maximise the benefits from the wool prices. The result is less production of mutton as fewer, older sheep are sold at auction. Although mutton is only a secondary product to wool in the north-eastern wheatbelt, it still contributes an important part of the sheep enterprise income.

In the 1993/94 season mutton made up some 62 percent of the export value of sheepmeat and 8.5 percent of the total value of meat exported from Australia (Walters and Clark 1994). Western Australia contributes some 10 percent to the total value of Australia's mutton trade (D. Stoate, DAWA 1994, pers. com.; Walters and Clark 1994). The destinations of Western Australia's mutton exports appear to be volatile with buyers coming in and out of the market, as table 4.9 indicates.

There are five markets of significant interest to the export of mutton from Western Australia:

a) The Middle East, which took 22 percent of mutton exports (D. Stoate, DAWA, 1994 pers. com).

b) Eastern Europe, which in 1992 took nearly 50 percent of mutton exports from WA (D. Stoate, DAWA, 1994, pers. com.).

c) Japan which continues to be a major importer of WA mutton.

d) The EU to which WA supplied 0.0009% of total EU sheepmeat consumption in 1991 (Haines 1992).

e) The USA which presents similar characteristics to that of the EU.

As with the other commodities the Agreement on Agriculture will have a positive effect on mutton prices. The exact change in price is difficult to estimate, but preliminary estimates suggest that the change in price will be moderate. A number of different sources have made estimates on how wheat prices might differ from what they would have been without a successful conclusion to the Uruguay Round (see Table 4).

Table 4 Estimated effects of GATT on mutton prices (% change)

Source	Long-run price change
Andrews et al., 1994	3
Andrews and Roberts, 1992	3
Goldin et al., 1993	3.7
Nixon and Rae, 1994	4
Vanzetti et al., 1993	2

3.5 Summary of impact of GATT on output prices

The general trend appears to be an increase in prices, although at varying degrees. It appears we can expect only a small increase in wool prices of between one half and two percent. Wheat is expected to increase the most with the extreme being 11 percent, but it has the widest range of predictions starting at four percent. Lupin prices are expected to increase between one and two percent and sheepmeat prices from two to four percent.

4 Implications of GATT for farm inputs

P. Knopke (1994, ABARE, pers. com.) identified the major variable inputs on an Australian farm as fertilisers, chemicals, fuel and oil. The following sections give estimates of the effects, if any, GATT will have on the various inputs.

4.1 Fertiliser

GATT will have no effect on fertilisers in Australia. The Australian fertiliser industry was deregulated in the late 1980's resulting in it becoming more directly linked to the world markets. Australia's fertiliser prices are controlled predominantly by movements in world prices, exchange rates and shipping rates now that Australia has removed all protection on its fertiliser industry (Knopke 1992).

Secondly, world trade in fertiliser is hindered very little by any barriers to trade such as tariffs and quotas (Constant and Sheldrick 1991). Therefore, any reduction in barriers to trade in fertiliser will change world prices very little. Thirdly, because Australia's fertiliser prices are influenced by world prices, and knowing that world prices will not be changing because of GATT, we assumed Australian prices will not change either.

4.2 Chemicals

Chemical inputs in the farming system referred to here include chemicals that control pests or diseases of crops and livestock, such as herbicides, fungicides and insecticides. It is difficult to determine the effect of GATT on farm chemical prices, but is expected to be minimal. The Uruguay Round will have no effect on the 1996 level of tariffs on farm chemicals because the cuts already implemented by the Australian government are beyond the levels required under the GATT rules (Department of Foreign Affairs and Trade 1993).

Where GATT may have some effect on farm chemicals is with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) (Prices Surveillance Authority 1993) but this is expected to be minor. For simplicity sake we assumed farm chemical prices will remain the same.

4.3 Fuel and oil

As with fertilisers, fuel and oil will not be affected by the GATT agreements because it is free of any protection in Australia from foreign imports. Therefore any changes in the price of fuel and oil in Australia will be a result of international factors as well as the competitive nature of Australia's industry and government internal policies.

4.4 Summary of impact of GATT on input prices

GATT is highly unlikely to change the major input prices of a north-eastern wheatbelt farm. Both fertilisers and fuel and oils are currently trading close to a free market situation, hence any liberalisation of trade will have little impact. Chemical prices in Australia are unlikely to change because of the independent tariff reduction scheme by Australia and the flexible rulings under the TRIP's agreement.

5 The north-eastern wheatbelt

The north-eastern wheatbelt of Western Australia is located in the top portion of the Western Australian wheatbelt. It extends from Perth through to the most northern point of the wheatbelt, as far as Kalbarri. This area is represented approximately by M1 and L1 in Figure 1. The letter L refers to low rainfall (< 325 mm) and M to medium rainfall (325 mm > 450 mm).

5.1 Soils of the North-eastern wheatbelt

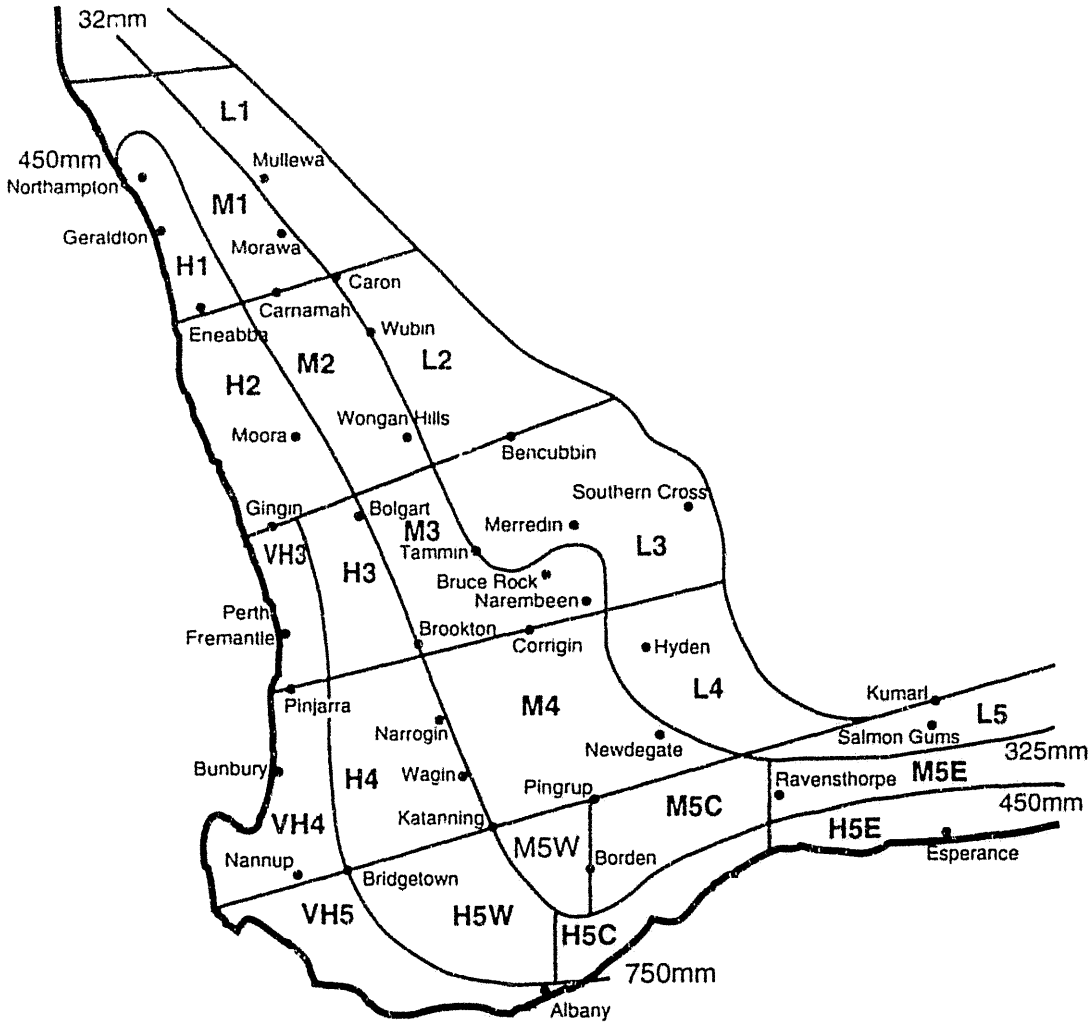
Soils of the north-eastern wheatbelt can be categorised into four main soil groups. These are acid sands, yellow sands, red loams and heavy soils. Their appearance and usefulness to the farming system are detailed in Pannell and Bathgate (1994) and Bestow and Perry (1991).

5.2 Climate of the North-eastern wheatbelt

The north-eastern wheatbelt is regarded as one of the drier regions of the Western Australian wheatbelt. It has a shorter growing season than the remainder of the wheatbelt because of its lower rainfall and higher temperatures. These climatic features of the north-eastern wheatbelt make farming in the area unique and at times difficult.

The wettest months on average occur between May and September. The annual rainfall for the Morawa and Mullewa shires are 332mm and 337mm respectively. For the months of May through to October when the majority of the rain falls, Morawa receives on average 236mm and Mullewa 253mm (Perry and Hillman 1991).

Figure 1 Rainfall regions of WA



Source: Brown, G. 1990, *1991 Crop Variety Sowing Guide for Western Australia*, WA Department of Agriculture, South Perth, Bulletin 4165.

The average temperature for the north-eastern wheatbelt is the highest of the whole Western Australian wheatbelt. According to Perry and Hillman (1991) Morawa tops the wheatbelt for the highest average maximum temperature in the summer, with a maximum of 36.6 °C and Mullewa is just 0.1 °C behind. The coolest maximum temperatures occur in July with Morawa averaging 17.9 °C and Mullewa 18.4 °C.

5.3 North-eastern wheatbelt farm inputs and outputs

For details of the cropping and sheep inputs and management techniques used in the farm model in the MIDAS program refer to the reference Pannell and Bathgate (1994). As a rule, output from a hectare of a north-eastern wheatbelt farm is either similar or below the state average on most products mainly due to lower rainfall and shorter growing seasons. There are exceptions to this depending on how the season finishes in other areas of the wheatbelt.

6 Methodology

Linear programming was selected out of a number of other methods capable of determining the most profitable mix of enterprises on a north-eastern wheatbelt farm. Other choices were whole-farm budgeting, partial budgeting and gross margin analysis. A profit maximising objective function, rather than others such as utility maximisation, was considered suitable for this study because most of the changes were marginal rather than major strategic changes. Attitude to risk and uncertainty was considered unlikely to have much of an effect on these types of changes. Also while farmers may not choose the most profitable mix in the short run they are likely to approach this in the long run.

Another influential reason for selecting linear programming was its speed of calculation and its simplicity. The Western Australian Department of Agriculture's MIDAS (Model of an Integrated Dryland Agricultural System) model was selected as the linear program for two reasons. Firstly, it was available at little cost or inconvenience and secondly, it was able to model the area of the Western Australian wheatbelt that was selected for the study. For more details on the model see Pannel and Bathgate (1994).

The version used to evaluate the effects of GATT on the north- eastern wheatbelt was LRNWM 94 (Low Rainfall Northern Wheatbelt Model 1994). This version of the MIDAS model incorporates some 443 activities with 275 constraints to select strategies that maximise profit in the medium term of between three to five years (Pannell and Bathgate 1994).

6.1 How MIDAS was used

MIDAS was used to find the most profitable mix of enterprises for a representative farm without the effects of GATT. As well, three different scenarios incorporating expectations about the full effects of GATT changes were examined for their influences on the most profitable mix of enterprises. A sensitivity analysis of a range of possible outcomes was also developed. The enterprise mix for 1994 was used as a base period to compare with the effects of GATT. The three scenarios incorporating the effects of GATT consisted of the upper extreme expected price increases, the lower extreme expect price increases and the average of the expected price increases as a result of GATT, for the major products. Each of these scenarios was compared to the without GATT enterprise mix (base period) to identify if the most profitable enterprise mix is likely to change. The sensitivity analysis was used to see at what point the mix is likely to change as well as cover all other possible combinations of the price changes between the extremes. The following two sections deal with how the representative farm was selected and the pricing strategy used.

6.2 North-eastern wheatbelt representative farm

The representative farm modelled in MIDAS is based on an average farm for the shires of Mullewa, Morawa and Perenjori. The size of the farm is based on the average farm size of the area; soil types and areas are based on the major soils, and average area of each soil type present on farms in the area; and the type of farm was one that combined cropping and sheep enterprises.

6.3 Basis for changing variables in the model

In order to isolate just the expected changes from the Uruguay Round of GATT on the north-eastern wheatbelt, all other variables, other than those expected to change, were

held constant. The only variables that were allowed to vary in each run of the MIDAS model were the expected changes in the gross price of either wheat, lupins, wool or sheep. The variables held constant came from the base model developed for the 1994 situation. In effect this means that the variables relevant in 1994, unless they were changing due to GATT, were the ones included in the models incorporating the effects of GATT. Listed below are the important variables that were held constant:

- Input costs
- Farmer knowledge
- Technology
- Climate

The agreements from the Uruguay Round will not be fully implemented until 2005. Therefore many variables may change by then, such as knowledge, technology and the world economic situation. If the variables mentioned above were allowed to change to what they are likely to be by 2005, it would become extremely difficult to isolate the effects of GATT. For example, would it be a small increase in price of lupins, or the significant advances in lupin breeding technology that has increased yields substantially, that has lead to an increase in area sown to lupins in a cropping enterprise. Therefore only the output prices were changed. The results refer to the situation without GATT changes, and with the GATT changes.

Prices for the major farm products without GATT changes are shown in Table 5. Prices for the three scenarios incorporating the effects of GATT can be found as follows: the lower extreme expected price increases (Table 6); the upper extreme expected price increases (Table 7); and the average of the expected price increases (Table 8).

Table 5 Price for major farm products without GATT changes

Product	Gross Price
ASW 10% protein wheat	$170.00/t
Manufacturing barley	$157.00/t
Feed barley	$137.00/t
Oats	$101.60/t
Triticale	$101.60/t
Lupins	$180.00/t
Field peas	$230.00/t
Wool - average greasy price (22 micron)	400¢/kg
Sheep	
- Ewes 2yr to 3yr	$13.60 - $15.00/hd
- Ewes 4yr to 5yr	$14.00 - $12.00/hd
- Ewe hoggets	$11.00/hd
- CFA ewes	$6.00/hd
- Wethers 2yr to 3yr	$12.00 - $16.00/hd
- Wethers 4yr to 5yr	$15.00 - $14.00/hd
- Wethers 6yr	$11.00/hd
- Wether hoggets	$12.00/hd
- Shipper wethers	$16.20 - $19.20/hd

Table 6 Prices for major farm products in extreme low price scenario

Product	% increase	Gross Price
ASW 10% protein wheat	4.0%	$176.80/t
Manufacturing barley		$157.00/t
Feed barley		$137.00/t
Oats		$101.60/t
Triticale		$101.60/t
Lupins	1.0%	$181.80/t
Field peas		$230.00/t
Wool - average greasy price (22 micron)	0.5%	402¢/kg
Sheep		
- Ewes 2yr to 3yr	2.0%	$13.90 - $15.30/hd
- Ewes 4yr to 5yr	"	$14.30 - $12.25/hd
- Ewe hoggets	"	$11.20/hd
- CFA ewes	"	$6.10/hd
- Wethers 2yr to 3yr	"	$12.25 - $16.30/hd
- Wether 4yr to 5yr	"	$15.30 - $14.30/hd
- Wethers 6yr	"	$11.20/hd
- Wether hoggets	"	$12.25/hd
- Shipper wethers	"	$16.50 - $19.60/hd

Table 7 Prices for major farm products in extreme high price scenario

Product	% increase	Gross Price
ASW 10% protein wheat	11.0%	$188.70/t
Manufacturing barley		$157.00/t
Feed barley		$137.00/t
Oats		$101.60/t
Triticale		$101.60/t
Lupins	3.0%	$185.40/t
Field peas		$230.00/t
Wool - average greasy price (22 micron)	2.0%	408¢/kg
Sheep	4.0%	
- Ewes 2yr to 3yr	"	$14.15 - $15.60/hd
- Ewes 4yr to 5yr	"	$14.60 - $12.50/hd
- Ewe hoggets	"	$11.40/hd
- CFA ewes	"	$6.25/hd
- Wethers 2yr to 3yr	"	$12.50 - $16.65/hd
- Wether 4yr to 5yr	"	$15.60 - $14.60/hd
- Wethers 6yr	"	$11.40/hd
- Wether hoggets	"	$12.50/hd
- Shipper wethers	"	$16.85 - $20.00/hd

Table 8 Prices for major farm products for average price scenario

Product	% increase	Gross Price
ASW 10% protein wheat	7.2%	$182.20/t
Manufacturing barley		$157.00/t
Feed barley		$137.00/t
Oats		$101.60/t
Triticale		$101.60/t
Lupins	1.75%	$183.15/t
Field peas		$230.00/t
Wool - average greasy price (22 micron)	1.0%	404¢/kg
Sheep	3.2%	
- Ewes 2yr to 3yr	"	$14.00 - $15.50/hd
- Ewes 4yr to 5yr	"	$14.45 - $12.40/hd
- Ewe hoggets	"	$11.35/hd
- CFA ewes	"	$6.20/hd
- Wethers 2yr to 3yr	"	$12.40 - $16.50/hd
- Wether 4yr to 5yr	"	$15.50 - $14.45/hd
- Wethers 6yr	"	$11.35/hd
- Wether hoggets	"	$12.40/hd
- Shipper wethers	"	$16.70 - $19.80/hd

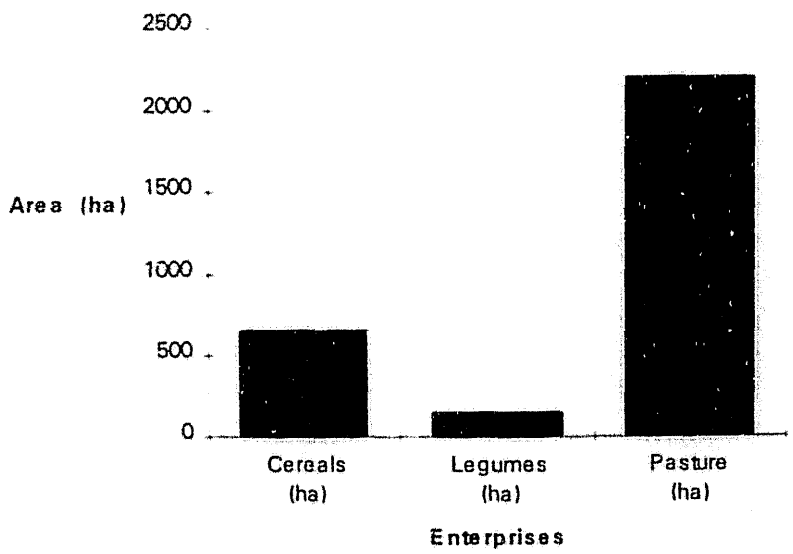
7 The effect of GATT on the north-eastern wheatbelt

In this section we present results from the application of the MIDAS model to test the hypotheses that GATT would not affect the most profitable enterprise mix and it would not change the profitability of the farms. The effects of the average-price and low-price increase scenarios are discussed together since their results were similar.

7.1 Effect on north-eastern wheatbelt farm of lower and average price scenarios

Figure 2 gives an indication of the cropping and pasture area, and the individual areas of each crop type before price changes from GATT were introduced. The most profitable mix of enterprises consists of 800ha of crop and 2,200ha of pasture and running 4,823 DSE of sheep. The total available land is divided into 27 percent cropping and 73 percent pasture. Of the cropping enterprises the mixture is 19 percent lupins and 81 percent cereals.

Figure 2 Enterprise mix without GATT



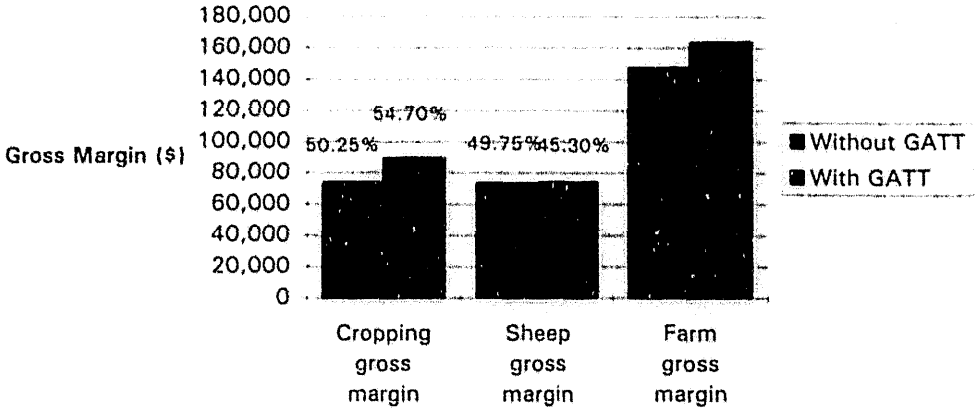
The results of the MIDAS runs indicate that with the lower and average of the estimated price increases for each product there is unlikely to be a change in the most profitable enterprise mix for farms in the north-eastern wheatbelt. The price increases are not

sufficient to induce a change to take advantage of the new prices, bearing in mind that the model selects those strategies that optimise profit over a medium term of three to five years.

The internal mix of each enterprise also remains the same for the same reason. Changes in wheat and lupin prices from an expected extreme low increase of 4 percent and 1 percent and an average increase of 7.2 percent and 1.75 percent respectively, are unlikely to be high enough to warrant a change in the medium term rotations to accommodate more wheat and lupins. The same can be said for the sheep enterprise. A farmer is unlikely to devote more land to pasture to accommodate more sheep because the price of wool increases by between 0.5 and 1 percent.

Although the farms may not change their enterprise mix they should receive considerable benefits from the price increases. Farm profitability with the same enterprise mix is expected to be considerably better than without GATT. The total gross margin of the farm in the analysis increased by 7.8 percent with the lower prices and 11 percent with the average prices. Returns, as defined by MIDAS, increased by 6.3 and 16.4 percent for the lower and average price scenarios respectively. Improved profitability is due simply to the increased prices, remembering all other variables were held constant. An important thing to note is that the make up of the total farm gross margin changed, from an almost 50:50 split without GATT to a slight dominance by the cropping enterprise of between 53 and 55 percent with the lower and average price increases from GATT (see Figure 3). This is a result of greater increases in grain prices compared to the wool and sheep price increases.

Figure 3 Comparison of cropping/livestock percentage of gross margin without GATT changes and average price changes from GATT

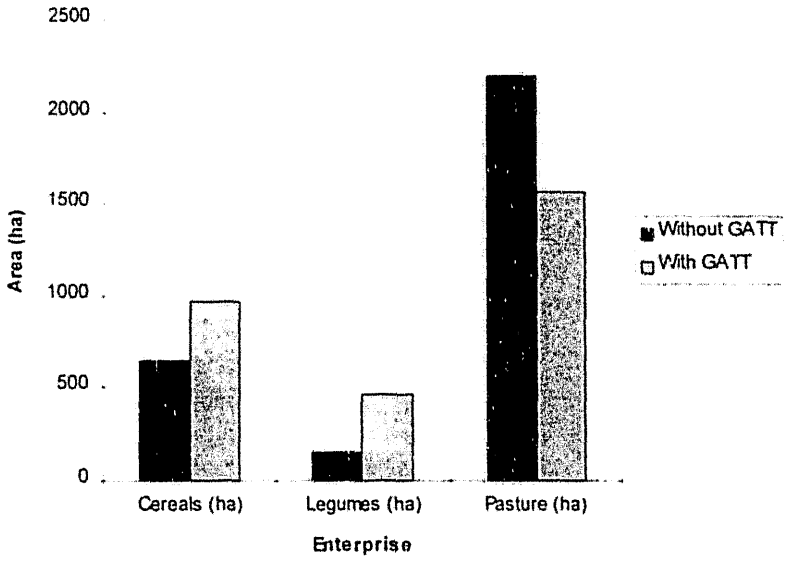


7.2 Effect on north-eastern wheatbelt farms of extreme upper price scenarios

The results indicate that if the prices of the major farm outputs increase by the extreme of their estimates there is likely to be a change in the most profitable enterprise mix on farms in the north-eastern wheatbelt. The price increases were enough to induce a basis change in the model. The general trend appears to be a movement away from the sheep enterprise and a concentration on cropping (Figure 4).

Within the cropping enterprise the composition is changed slightly. Lupins became a greater part because of the reduction in the area of pasture. The original pasture-pasture-cereal rotation on the red loams was altered to accommodate the higher priced grains. Of the original 1500ha committed to the pasture-pasture-cereal rotation without GATT, 553ha remained, while the additional 947ha was re-allocated to a cereal-cereal-lupin rotation. It was considered to be more profitable on the red loams to plant a portion of it to crop than run just sheep. This is the result of the lupin prices increasing enough to stay in the mix with wheat, while displacing sheep and wool. The biological benefits for wheat were also considered when selecting the most profitable rotational policy on the red loams. The remaining soil types continued with the original rotational policy.

Figure 4 Comparison of the most profitable enterprise mix without GATT and with extreme upper price changes from GATT



The sheep enterprise was reduced to make way for the more profitable cropping enterprise. As the cropping enterprise increased on the red loams the sheep enterprise reduced, consequently the pasture phase decreased

Unlike the cropping enterprise the internal mix of the sheep enterprise did not alter. It was still profitable to sell wethers before the age of four years. If, on the other hand, wool prices increased greater than sheep prices the structure may have changed with wethers being kept on the farm longer to maximise the wool clip. As it stands for the wool prices increased little, making it profitable to continue selling sheep.

A significant impact of the extreme price increases on the farm is the improvement in profitability. The gross margin increased by some 25.5 percent and returns by 25.6 percent. This is simply a reflection of the higher prices and the restructuring of the enterprise mix to best utilise the available constraints, such as land. To maximise profit resources moved into the areas that provided the better returns over the medium term of three to five years. In this case the shift was towards the cropping enterprise.

The movement toward the cropping enterprise and away from sheep was reflected in the gross margin. Cropping increased its gross margin by 69 percent, whereas sheep dropped by 18.4 percent. Thus, the total gross margin of the new enterprise mix show crops dominating with 67.6 percent and sheep contributing only 32.4 percent.

7.3 Sensitivity analysis for GATT price effects

A sensitivity analysis of the results indicated the enterprise mix is unlikely to change unless the more extremes of the expected price increases are experienced. Based on the results of the MIDAS model the mix of enterprises are likely to begin changing at the point where the price of wheat increases by 11 percent, lupins by two percent, wool by half a percent and sheep by two percent. This point can be referred to as the threshold for a change in enterprise mix. It is important to note that at this point the grain prices are at their more extreme upper levels of price increases whereas wool and sheep are at their extreme lower levels. Up to the threshold point the increase in prices of each product has been relatively even. At an 11 percent increase in wheat and two percent in lupins, a considerable gap in the prices is created between the cropping and sheep that is large enough to warrant a movement towards the cropping enterprise.

It was unlikely that there could be a movement towards the sheep enterprise because the extreme upper expected increase in wool and sheep prices are well below those of the grain prices, with two percent and four percent respectively, compared to wheat at 11 percent and lupins two to three percent.

8 Conclusions

It appears that the enterprise mix of a north-eastern wheatbelt farm is unlikely to change as a result of the Uruguay Round unless the price increases are in the higher estimated levels. We found that both the extreme low and average expected price increases did not change the enterprise mix, yet it increased the profitability of the farm. The sensitivity analysis suggests that the enterprise mix is not likely to change unless wheat prices increase by the extreme 11 percent. Even at the 11 percent increase in wheat prices there is still the requirement for one or two of the other products to increase

moderately before a change in enterprise mix will result. If the extreme price increases do eventuate there is a strong possibility that the enterprise mix will change. It appears that the trend would be a movement away from the sheep enterprise with a concentration on the cropping enterprise, in particular wheat and lupins. In any event the sensitivity analysis suggests that the profitability of the farm is likely to be improved as a result of the Uruguay Round.

Given these results it is difficult to reject the first hypothesis that the Uruguay Round of GATT will have no effect on the most profitable mix of enterprises on a north-eastern wheatbelt farm. On the other hand positive increases in output prices will improve returns to farmers in the area.

9 References

Ahmmadi-Esfahani, F., Jensen, P., and Stanmore, R. 1994, 'Australia's position in the international wheat market: an alternative view', *Australasian Agribusiness Review*, 2(1), June 1994, 20-27.

Andrews, N., Roberts, I., and Hester, S. 1994, 'The Uruguay Round outcome: implications for agricultural and resource commodities', *Outlook 94'*, Australian Bureau of Agricultural and Resource Economics, Canberra.

Andrews, N. and Roberts, I. 1992, 'The Dunkel Uruguay Round text: implications for agriculture - an Australian view', *Proceedings of the Pacific Economic Cooperation Conference*, East-West Centre, Honolulu, 14-16 May, 8-12.

Anon 1993, 'Success!: The most comprehensive round ever is concluded' *Focus: GATT Newsletter*, No 104, December, 1-8.

Anon 1994, 'A history of the GATT', *AgExporter*, US Department of Agriculture, VI·6), June, 21.

Bestow, S. and Perry, M. 1991, *Growing High Yielding Wheat Crops in the Northern Agricultural Regions*, WA Department of Agriculture, South Perth, Bulletin No. 4215, March.

Constant, K. and Sheldrick, W. 1991, *An Outlook For Fertiliser Demand, Supply and Trade 1988-89 to 1993-1994*, World Bank Technical Paper No. 137, Washington DC.

DAWA 1994, *1994 Farm Budget Guide*, Department of Agriculture, South Perth.

Department of Foreign Affairs and Trade 1993, *'Uruguay Round: Outcomes for Australia'*, Department of Foreign Affairs and Trade (Trade Negotiations and Organisations Division), Canberra, December.

Doyle, S., Andrews, N. and Fisher, S. 1994, 'World agriculture in a post-GATT environment', *Proceedings of the International Conference on 'World Agriculture in a Post-GATT Environment'*, University of Saskatchewan, Saskatoon, Canada, 13-15 June, 1-11.

DPI 1994, 'Barley Report on Uruguay Round', Department of Primary Industries, Perth.

Dunkel, A. 1987, 'GATT: the first forty years', *Journal of Australian Foreign Affairs Record*, 58(10), November/December, 601-602.

Fray, P. 1994, 'How GATT was got', *The Bulletin*, 11 January, 70-71.

Gill, P. 1994, 'The good, the bad and the GATT', *Australian Financial Review*, 12 April, 17.

Goldin, I., Kundsen, O. and van der Mensbrugghe, D. 1993, *Trade Liberalisation: Global Economic Implications*, Organisation for Economic Cooperation And Development, World Bank, Washington DC, USA.

Haines, M. 1992, *A Report To The Western Australian Meat Marketing Corporation*, Muresk Institute of Agriculture, Curtin University of Technology, August.

Knopke, P. 1992, 'World fertiliser market developments and Australian agriculture', *Agriculture and Resource Quarterly*, 4(4), December, 603-617.

Meyerink, B. 1994, 'The Australian pulse industry in perspective', *Outlook 94'*, Australian Bureau of Agriculture and Resource Economics, Canberra, Australia, 195-199.

Nelson, P. and Delane, R. 1990, *Producing Lupins on Western Australia*, Bulletin No. 4179, WA Department of Agriculture, South Perth, March.

Nixon, C. and Rae, A. 1994, 'The GATT settlement: what sort of deal?', *Journal of Agricultural Science*, 7(5), September-October, 27-30.

Orr, J. 1994, 'Implications of CAP and GATT reforms for lupin marketing', *Outlook 94'*, Australian Bureau of Agriculture and Resource Economics, Canberra, 200-204.

Oxley, A. 1990, *The Challenge of Free Trade*, Billing and Sons, Worcester, Great Britain.

Pannell, D. and Bathgate, A. 1994, *MIDAS: Model of an Integrated Dryland Agricultural System*, Economic Analysis Branch, WA Department of Agriculture, South Perth, WA.

Perry, M. and Hillman, B. 1991, *The Wheat Book: A Technical Manual For Producers*, Bulletin No. 4196, WA Department of Agriculture, February.

Prices Surveillance Authority 1993, *Inquiry Into the Prices of Farm Chemicals*, Report No. 49, Prices Surveillance Authority, 23 August.

Short, C., Morris, P., Roper, H. and Leu, M. 1991, 'The cost to Australian wool growers of US apparel protection', *Agricultural and Resource Quarterly*, 3(1), March, 77-84.

UN 1990, *Agricultural Trade Liberalisation in the Uruguay Round: Implications for Developing Countries*, United Nations, New York.

Vanzetti, D., Andrews, N., Hester, S. and Fisher, B. 1993, 'US-EC agricultural trade relations and the Uruguay Round: a Cairns Group perspective', Paper presented to the International Conference on 'New Dimensions in North American-European Agricultural Trade Relations, Calabria, Italy, 20-23 June.

Walters, P. and Clark, J. 1994, 'Sheep Meat', *Australian Commodities*. 1(3), September. 296-316.

Young, E. 1994, *Uruguay Round Outcomes: Agriculture*, Agriculture Branch of Trade Negotiations and Organisation Division, Department of Foreign Affairs, Canberra.