Appendix C

The Economics of the Commercialization of Guayule in New South Wales*

Guayule as an Alternative Crop in New South Wales

In addressing the subject of guayule as a potential dryland crop in New South Wales, it must be realized that it is not suitable as a replacement for any currently profitable cash crop but for use on land which can no longer support crops that require an excess amount of water.

Various crops are dryland farmed along the western slopes of New South Wales including wheat, barley, sorghum, and sunflowers. Of these, wheat is by far the most predominant crop.

There is not sufficient data on guayule to accurately make a comparison with other crops. Taking into consideration that such factors as rubber yield per acre and price per lb/rubber are strictly projections, a budget can be developed that will contribute to a broad understanding of the economic potential of guayule in New South Wales.

Due to the fact that there is no commercial guayule that has reached productive maturity in either the United States or Australia, budgets must be developed from information attainable from other crops and meager data on guayule.

The Office of Arid Lands Studies in Tucson, Ariz., under a contract with the State of California, Department of Food and Agriculture, has recently developed budgets for guayule production in four different areas of California including the San Joaquin Valley, Southern California desert, Sacramento Valley, and the central coast area. Of these four budgets, the San Joaquin Valley area is the most favorable of the four locations because of its low cost of production per acre. This particular budget will serve as a model from which to develop the estimated costs of producing 1 acre of dryland guayule in New South Wales.

*Source: A. Siddigui and P. Lockton, *A Feasibility Study on the Commercialization of Guayule in New South Wales, Australia,* Division of Plant Industry, California Department of Food and Agriculture, Sacramento, Calif., December 1981.

Estimated Costs of Producing 1 Acre of Guayule in New South Wales

With respect to the estimated cost of producing *1* acre of dryland guayule, the following points should be made.

A 5-year growing cycle is used in this budget although this time period is variable due to the amount of rainfall a specific site would receive. Plant density varies according to irrigated or dryland cultures. Because of an increase in potential climatic uncertainties contributing to plant loss (due to a longer production period of 5 years), a total of ***15,000*** seedlings/acre is used at a cost of $().() S/seedling. Seedlings cost approximately $0.04 each delivered, although growers anticipate that an increase in commercial plantings will result in a drop to $0.03 per plant.

Weeds have been a problem in various experimental guayule plantings and will invariably present a problem in New South Wales, In this budget chemical weed control, cultivation, and hand hoeing are all included. No herbicides are registered for guayule and, therefore, the chemical weed control cost is an estimated amount. Fertilizer is also included in this budget, although exact amounts would typically be dependent on results from soil analyses taken from specific sites.

Although rent value of land, interest on variable costs, and a charge for management profit are not necessary out-of-pocket costs, they are legitimate charges. If the land was not planted with guayule, the landowner has the option of leasing the land for other crops. An interest charge of 15 percent on borrowed production costs is included. This has been calculated on variable production costs and rent value of land,

A return to management of **$26** per acre per year is used. In various parts of California a percentage of the gross is the accepted method, but with the time lag of 5 years between planting and harvesting for guayule, a uniform charge per year is used.

Scenarios A and B represent two different yields of rubber per acre. It must be stressed that these

are estimated amounts and are not necessarily applicable to typical dryland yields.

Following these calculated production costs is a break-even table that is based on the estimated total production costs and a variety of yields and prices. Yields vary from ***1,000*** to ***3,000*** lb of rubber per acre, while rubber prices run from ***$0.40*** to $1.00/lb.

Scenario A	*Australian $*
Total production costs	$-1,099
Processing ((),235/lb X 1,500 lb rubber)	+353
Subtotal	$1,452
Less byproduct value (0.244/lb X 1,500 lb rubber)	–366
Total costs	$1,086
Break-even price for rubber (1,500 lb/acre)	$0.724
11/30/81 New York price of rubber	0.422
Loss/lb	$0.302
Loss/acre	$657

A yield of **1,500** lb of rubber per acre over a 5-year period represents a current realistic figure of a dryland situation. This figure is based on personal interviews with various California guayule researchers and estimates of yield conducted by the Emergency Rubber Project.

Scenario B	*Australian $*
Total production costs	$1,099
Processing (0.235/lb X 3,000 lb rubber)	+705
Subtotal	$1,804
Less byproduct value (0.244/lb X 3,000 lb rubber)	–732
Total costs	$1,072
Break-even price for rubber (3,000 lb/acre)	$0.357
11/30/81 New York price of rubber	0.422
Profit/lb	$0.065
Profit/acre	$195

Research conducted by the California Department of Food and Agriculture in conjunction with various other guayule researchers has resulted in the belief that new improved varieties of guayule should produce more rubber in less time, and, therefore, a yield of 2,500 to 3,000 lb of rubber per acre is a representative estimate of future yields. It is hoped that seed from these varieties will become available in approximately 5 to 10 years,

Table C-1.—Estimated Costs of Producing 1 Acre of Dryland Guayule in New South Wales, Australia[a]

	Australian $
First year	
Establish stand (idle farm land)	
Disk (2 x)	14
List and shape beds	12
Fertilizer	4
Chemical weed control	13
Seedlings—15,000/acre	392
Planting	80
	515
Culture	
Cultivate (2 x)	13
Cash farm overhead	9
	22
Second year	
Cultivation	13
Chemical weed control	7
Cash farm overhead	7
	27
Third year	
Chemical weed control	7
Cash farm overhead	7
	14
Fourth year	
Chemical weed control	7
Cash farm overhead	7
	14
Fifth year	
Cash farm overhead	5
Dig plants	39
Windrow	9
Bale	78
Haul (field to processing plant)	44
	175
Subtotal	$767
Rent value of land @ $8/acre/yr **x** 5 yrs.	40
interest—5 yrs @ 150/0	162
Profit to management	130
Subtotal	$332
Total production costs	$1,099

[a]Based on the rate of exchange as of Nov. 30, 1981: $1.00 U.S. = $0.87 Australian.

Table C-2.—Per Acre Income Above Costs (processing costs included)

Yield	Price of rubber per pound						
Pounds of rubber per acre	0.40	0.50	0.60	0.70	0.80	0.90	1.00
1,000	–690	–590	–490	–390	–290	–190	–90
1,500	–486	–336	–186	–36	+114	+264	+414
2,000	–281	–81	+119	+319	+519	+719	+919
2,500	–77	+173	+423	+673	+923	+1,173	+1,423
3,000	+128	+428	+728	+1,028	+1,328	+1,628	+1,928

NOTE: If 2,000 lb of rubber per acre were produced, rubber prices would have to be near $O.6011b to break even or pay all production costs. In December 1981, smoked sheets of rubber in New York were priced at less than $0.50/lb. At current prices, guayule is not an economical crop to grow at present estimated yields of 1,500 lb/acre.

New improved varieties of guayule should produce more rubber in less time, and therefore a yield of 2,500 to 3,000 lb of rubber per acre is a realistic projection of future yields. The table shows that at 2,500 lb of rubber per acre, rubber prices would have to be near $(X50/lb to break even, and at 3,000 lb of rubber per acre they would have to approach $0.40/lb.

Conclusions and Recommendations

Conclusions

The development of a guayule industry in New South Wales would have a significant impact on the state's economy. Most importantly, it would create a viable agro-industry to supply local and export markets and would lessen Australia's reliance on imported rubber. In addition, it would create employment opportunities in remote areas.

An optimistic assessment of the potential of developing a guayule rubber industry in the western slopes and plains of New South Wales is based on the following factors:

1. Millions of hectares of light textured soils, especially the "Mallee" types, are available.
2. The economics of growing guayule in New South Wales is more favorable than in the United States because of the relatively low cost of land along the north-south belt stretching through central New South Wales.
3. With the average annual rainfall of *350* to *500* mm distributed evenly throughout the year in the central north-south belt through New South Wales, guayule would require little or no irrigation.
4. Prevailing temperatures and soil types in the central north-south belt appear suitable for guayule cultivation.
5. Unlike the hevea rubber industry, guayule is not a labor-intensive crop, as it is easily adapted to mechanization.
6. The New South Wales Department of Agriculture has a successful record of introducing new crops (e.g., cotton, rapeseed, and lupins) into the state. The Department, therefore, has a capable staff and the necessary facilities to initiate a guayule development program in New South Wales.

Recommendations

The establishment of guayule as a commercial industry in New South Wales is dependent on not only environmental conditions but such factors as land prices, the present-day agricultural situation, and, most importantly, the implementation of a successful development program,

The following are recommendations that were made by the senior author to the Premier of New South Wales and the Department of Agriculture at the conclusion of his trip to New South Wales in November *1980.* At this point, all of the recommendations have been accepted and are being implemented. The program is now 1 year old.

Along with each recommendation is a summary of the corresponding action that has been put into effect by the New South Wales Department of Agriculture, This information has been excerpted from the ***Initial Report of Guayule Research and Development in New South Wales*** by P. L. Milthorpe.

1. **A 3-year guayule development program similar to the one in the State of California be initiated immediately in New South Wales to determine whether or not a viable industry can be established.**

Early in 1981, a special Treasury grant was approved by the Premier which allocated the required financial support necessary to implement a 3-year guayule development project. The project consists of four steps as follows:

a) identification of the most suitable soils and climate for guayule cultivation;
b) development of the optimum package of agronomic technology;
c) evaluation of genetic material to identify the best material developed in overseas breeding programs; and
d) evaluation of the rate of rubber accumulation in the laboratory.

2. **Guayule test plots ranging from *0.25* to 5.0 hectares be established at Narrabri, Trangie, Condobolin, Hillston, and Yanco. Both transplant and direct seeding methods of planting should be explored** under irrigated and dryland farming situations.

Initial plantings of seedlings were made at Condobolin and Yanco in November 1980 followed by further plantings at the research centers at Narrabri and Trangie in mid-January. Additional plantings were made at North Star, Warialda, Hillston, Wagga Wagga, and Deniliguin.

Generally, the same procedure was adopted for planting at each site. This involved hand planting 8- to 10-week-old hardened-off seedlings. These were initially grown in 10 cm plastic pots and later in 4 x 4 x 15 cm tubes, The plants were immediately irrigated when planted and then were watered periodically until the rain began,

To date, no work has been conducted on direct seeding, Once pelleted seed is available, this method of planting will be evaluated.

3. **A guayule genetic resource collection of all varieties received from California and other sources should be established at Condobolin with the goal of increasing the seed of these varieties.**